

## 'It's Important to Know In Time'

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The Newspaper of the Industry

# Air Conditioning & REFRIGERATION

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## 'Written To Be Read on Arrival'

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## Inside Dope

By George F. Taubeneck

Selective Service  
More 'Freon'—at Last!  
Unravelling the Tangle  
How to Detect It  
Directions For Detecting  
Methyl Chloride  
Refrigerator Baby  
Dies; Fund Closes

### Selective Service

Refrigeration repair organizations who are finding difficulty holding skilled service men during this present thoroughgoing comb-out of the 26-29 age group by local draft boards will do well to quote the following from the War Manpower Commission Release 2036:

"Experienced refrigeration repair men, now working on jobs less important to the national welfare, have been requested by the War Manpower Commission to return to their former occupations. The peacetime total of approximately 28,000 of these repairmen in domestic service has decreased about 70% during the war.

"The shortage of such workers presents a serious threat to national health. War conditions make proper refrigeration, always necessary, vitally important. Refrigeration equipment, however, is impossible to replace. Old machinery must be repaired and kept in use if the nation's food supply and the people's health are to be preserved."

That states the case fairly well, and it is an official statement made by the War Manpower Commission's headquarters in Washington.

It might be added that last summer the War Production Board, realizing the acute need for new refrigeration equipment for the home front, had programmed early resumption of refrigeration manufacturing for civilian supply. At that time it was hoped that such equipment could be available in considerable quantity by the second quarter of 1945.

These programs were quashed, however, when Von Rundstedt broke through in December. Earliest we can expect much new equipment for civilian use now is the end of the year.

This means that refrigeration service men will have to work harder than ever next summer when mechanical failures among the nation's too-old and too-worn-out refrigeration systems begin to multiply. We need every skilled repair man now available—and lots more!

### More 'Freon'—at Last!

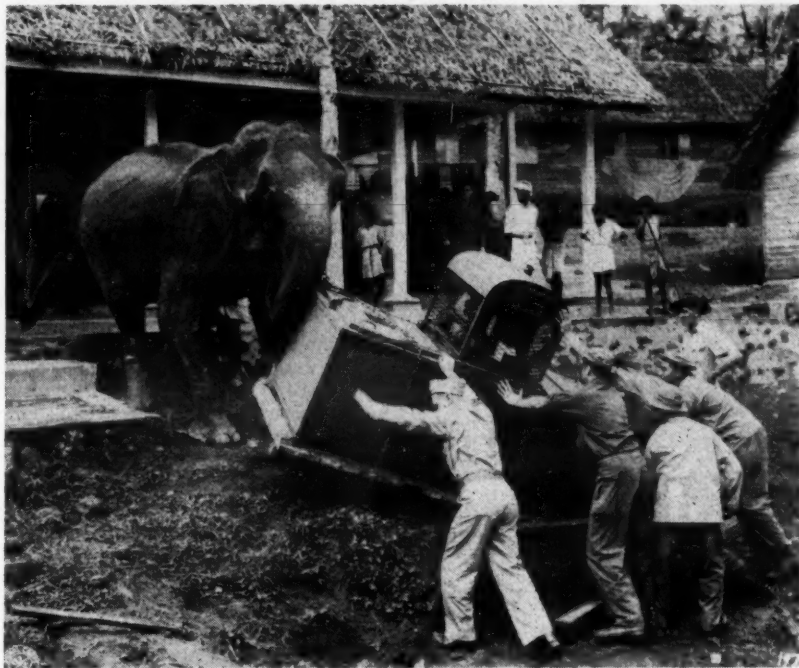
Few supply shortages have plagued the refrigeration and air conditioning industry so much as the almost non-availability of "Freon" (dichlorodifluoromethane). By an odd freak of circumstance, this vital refrigerant happened to be the only diffusing agent which would work with pyrethrum in the Army's famed mosquito-eradicator, Aerosol. So the Army took so much "Freon" that civilians haven't been able to recharge their machines with this volatile gas.

Those new production facilities, however, are now pouring the stuff out; and it's an open secret that appeals to the WPB for recharge allocations of this formerly unobtainable gas are now being processed satisfactorily.

One example: The Automatic Refrigerating Co. of New York recently received 12,000 lbs. of dichlorodifluoromethane for use in hotels. Other appeals will be treated—in order, and after the usual delays—with equal fairness, we understand.

(Concluded on Page 6, Column 1)

## How the Army Moves Refrigerators In Asia



A 2,600-pound Army mechanically operated refrigerator is moved into quarters at a Southeast Asia Command headquarters with the help of soldiers and Karunavathi, 35-year-old elephant. This type of self-contained refrigeration equipment, designed and produced in mass style by the refrigeration industry, is the principal factor that enables the Army to supply its fighting men with fresh foods.

## WPB 'Clears' Labor For 1945 Production of Some Appliances

WASHINGTON, D. C.—Manufacturers who were authorized to produce domestic electric ranges, domestic and commercial electric fans, and electric irons in 1944, but have not obtained the necessary labor clearance for 1945 authorizations, recently were assigned temporary authorizations to continue production by WPB.

At the same time, the Malleable Iron Range Co., Beaver Dam, Wis., was assigned a final authorization for the production of 3,750 electric ranges in each of the first two quarters of 1945. No other manufacturers of ranges, fans, or irons have yet been assigned final production authorizations for the first quarter.

The Malleable Iron Range Co. is authorized to make 2,750 four-burner

(Concluded on Page 32, Column 1)

## 'BRLs' Providing Fresh Food In the Pacific

WASHINGTON, D. C.—The refrigerated barges that are now giving many American soldiers stationed on U. S.-occupied islands in the South Pacific their first taste of fresh meats and vegetables—and ice cream—have been officially designated as BRLs (Barge, Refrigerated, Large), and thus join the fleet of special craft which have made U. S. armed forces the greatest amphibious fighting force in the world.

It is probable that next to a boat bringing mail, nothing is so welcome to our soldiers in the Pacific area as the sight of the BRL. They will operate as floating chill-freeze warehouses. Transportation Corps operated small boats, used almost exclusively for inter-island service, will

(Concluded on Page 19, Column 1)

## Hadden President of Kelvinator of Canada

LONDON, Ont.—C. W. Hadden is the new president and R. L. C. Smith the new secretary and treasurer of Kelvinator of Canada, Ltd.

Mr. Hadden came into the refrigeration industry in 1926 as one of the original executive group of

(Concluded on Page 29, Column 1)

## 88% of York's Orders Are 'Essential' Type Refrigeration Items

YORK, Pa.—More than 88% of the \$20,012,307 worth of uncompleted orders on hand at York Corp. at the end of the last quarter were for refrigeration and air conditioning contracts related directly or indirectly to the war effort.

Operating results for the first quarter of the current fiscal year, tabled against the statement for same period last year, report a net profit of \$422,529 this year in contrast to \$252,348 last year.

The company's fiscal year begins with Oct. 1. Net profits before deduction of income and excess profits taxes, and before deduction of contingency charges, totaled \$1,763,029 for the first quarter, but less than a fourth of this figure remained after these subtractions.

## Problems In Testing Warplane Equipment Solved by Refrigerated Flight Chambers

By C. Dale Mericle

WOODSIDE, Long Island, N. Y.—Before the war, refrigeration units for trucks were the principal product manufactured by Mobile Refrigeration, Inc., (now a division of Bowser, Inc.), but not long after Pearl Harbor, the company found itself making airplane test equipment for the Armed Forces and the airplane industry.

This shift in production created many new problems, according to Erwin Ludwig, chief engineer, for the development of altitude chambers necessitated extremely low temperature refrigeration units, unusual humidity control, as well as air pressure control to simulate high altitude flying conditions.

"A great variety of equipment is being called upon to operate satisfactorily at conditions met at high altitudes," explained Mr. Ludwig. "In order to obtain satisfactory performance, adequate pre-flight testing facilities had to be devised to determine the performance characteristics of this equipment at high altitude conditions. Various tests were made at reduced pressures, low temperatures, and variable humidities.

"In a great number of instances the equipment under test performed satisfactorily under all of the above conditions when subjected to them one at a time, but failed in actual

## Air Conditioning's Role In Bombsight Production Told

DAYTON, Ohio—How air conditioning helped solve a problem that threatened to almost nullify this nation's efforts to become the leader in military air power was recently revealed by the Army Air Forces' Air Technical Service Command at Wright Field here.

Success of our bombing attacks depended upon use of the famed Norden bombsight, and this instrument in turn depended for its precision upon the smallest of ball bearings—about 1/25 in. in diameter—which were available only in Germany, it was explained. War with Germany naturally curtailed this supply, so American firms in 1942 began development of mass production methods to fulfill this vital demand.

It required more than a year before problems involved in producing these bearing balls with tolerances of .0001 to .00005 inch were solved by manufacturers, the Army said.

Air conditioned rooms where temperature, humidity, and air pressure were closely controlled, were found necessary for production within these extremely close limits. In addition, it was stated, no dust could be permitted within the manufacturing space, so an electrostatic dust remover was included in the air conditioning system.

## 100 Below Cabinet Conditions Gages, Tests Instruments

TOLEDO—A testing cabinet providing temperatures in a range of -100° F. to 158° F. provides a double function in the plant of Air-Way Electric Appliance Corp. here which is producing equipment for the armed forces.

Original design testing of airborne electrical equipment is carried out in a range of from -68° F. to 158° F. under controlled temperatures of humidity.

(Concluded on Page 4, Column 3)

## Electric Motor Supply Unlikely To Improve Soon

WASHINGTON, D. C.—There is little hope for any immediate improvement in the supply of electric motors for civilian use, and in some types of motors the situation "may get worse before it gets better," reports from WPB indicated last week.

Production of fractional horsepower motors will be at approximately the rate for the fourth quarter of 1944 for future requirements.

It is expected by WPB that users of motors will be held to approximately fourth quarter delivery of motors in the future, also.

Production of integral horsepower motors during the next six to nine months will be as critical as any period in the last two years, declared the Integral Horsepower Electric Motor Industry Advisory Committee.

Several top urgency War production programs involving considerable quantities of electric equipment have been initiated or expanded. The tight manpower supply together with an anticipated tight supply of materials such as copper and brass strip, sheet and wire, aluminum strip and sheet and steel castings will make increased production difficult, it was explained.

The recently devised WMC list of essential activities put production of electric motors and controls on the "critical" activity list, WPB men told the committee.

## Service Council Plans Manpower Meeting

CLEVELAND—A meeting of the National Refrigeration Service Council has been called for Feb. 19 at the Statler hotel in Washington, D. C., for the purpose of tackling new problems in refrigeration repairman manpower that have developed from the new draft rules, reports W. Ray Kromer, temporary chairman.

Mr. Kromer said that an audience is being requested with manpower officials to present evidence that the refrigeration service industry should be on the "critical" list of occupations, and not merely an "essential" service of the type that brackets it with the repair of bicycles, sewing machines, and the like.

Failure to give better recognition to the service field, he said, would jeopardize public health in communities where local draft boards and WMC office may not recognize a critical situation before irreparable damage might be done.

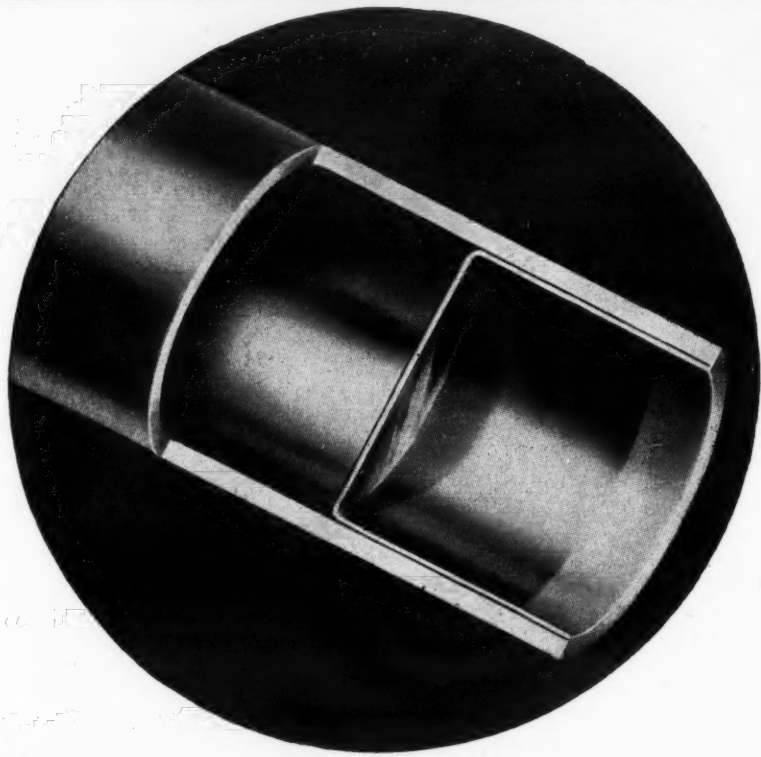
## 'Foul' Air In Factories Slows Foundry Work

WASHINGTON, D. C.—Because of "intolerable" working conditions in foundries, principally foul air conditions, production of radiation and boiler equipment is continuing to decline in the face of expected sharp increases in civilian and military requirements for 1945, it was brought out at a recent meeting here of the War Production Board's Cast Iron Boiler and Radiator Advisory Committee.

Chief recommendations of the labor advisory committee to improve production, which in 1944 was 25% under schedule, call for ventilating systems to remove gases and smoke, and proper heating of foundries.

(Editor's Note: A detailed account of the ways in which improper ventilating and heating systems can seriously curtail war production is presented on pages 20 and 21 of this issue.)





## The man-on-the-job likes ANACONDA CUP-SEALED\* TUBES

It's A SMALL THING perhaps, this Cup-Seal that keeps Anaconda Refrigeration Tubes dry, protects the bright, clean inside surface, saves waste and makes it easy to run tube through openings but little larger than the tube itself. But those things mean a lot to the man-on-the-job. They add up in minutes saved and in the kind of work that builds customer good will.

Perhaps this exclusive Cup-Seal is

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Anaconda Copper Refrigeration Tubes, (99.9+ percent pure), are manufactured in accordance with A.S.T.M. Specifications B68-43. They are available in all standard sizes up to and including 3/4" O.D. and are stocked by distributors in 25, 50 and 100-foot coils. Longer lengths on special order.



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NO. 1 OF A SERIES

## DEHYDRATION A BASIC REFRIGERATION PROBLEM

### M&E WAS A PIONEER In Solving HEAT TRANSFER PROBLEMS

To the merchant, the storage of food products with a minimum of dehydration, is a matter of simple economics. Dehydration—weight loss—and profits lost, are all equal terms when you sell by the pound.

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Any difference in temperature between coil and product results in a migration of moisture to the colder surface.



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AND FIN-TYPE COIL  
PRODUCTS

## Air Conditioning System Brings 35% Boost In Plane Production

### Naval Aircraft Plant Finds Controlled Atmosphere Vital In Dope & Fabric Shop

PHILADELPHIA—Two air conditioned rooms in which indoor weather is kept the same the year around are boosting the production of vitally needed training planes by 35% at the U. S. Naval Aircraft factory here.

The equipment, designed by engineers of the York Corp. in York, Pa., has made possible continuous production operations in this naval plant for the first time. Installed in the fabric and dope shops of the factory, the air conditioning has saved thousands of man hours and prevented the spoilage of equipment normally ruined by a 10 to 20% change in outside weather conditions.

In both the fabrication room, where the canvas-like covering is stretched on the frames of the aircraft, and in the dope shops where the coating is applied to the fabric, work normally is suspended when humidity rises above 68% or drops below 58%.

A sudden change in humidity in the fabricating operation, according to Capt. A. E. Harrison, commanding officer of the factory, meant that carefully stretched fabric would sag on the framework making it necessary to re-cover the entire plane.

Even in winter months, weather

variations shut down the operation frequently for the low humidity of cold days is as dangerous as the occasionally high humidity of rainy days.

In the dope shop, for example, low humidity produced thousands of tiny cracks on the coated surface of the fabric. When this occurred, workers had to remove the whole covering or re-dope the surface.

Capt. Harrison pointed out that a repainted aircraft framework under these conditions reduces the ultimate speed of the plane by 16 miles per hour. High humidity, on the other hand, makes drying of the doped surface virtually impossible.

Air conditioning now maintains an average temperature of 80° F. and a relative humidity of 62% throughout the year. The system, using centrifugal compressors, water-cooled condensers and electrostatic air cleaners produces the equivalent of 275 tons of refrigerating effect every 24 hours.

Preheating and reheating of the air is handled by a steam plant on days when temperature must be dropped below normal to attain correct humidity. The equipment delivers 80,000 cubic feet of air a minute.

## Frigidaire Plans Complete Analysis To Fit Veteran Into Job He Can Best Do

DAYTON, Ohio—Carl A. Copp, manager of industrial relations, Frigidaire Division, General Motors Corp., has recently announced the putting into effect of a program for veterans' re-employment.

At the present time a total of 230 discharged veterans of the present war, formerly employed by the Frigidaire factory are back at work in the Dayton plants under this re-employment program.

The plan includes features not found in many other veterans' programs, in addition to carrying out the provisions of the re-employment section of the government's Selective Service Act.

Under this act, a former employee who is honorably discharged from the armed services is entitled to his old job back if it was not a "temporary" job; if the job is still operating; if the veteran wants his old job; if he is able to perform the duties of the job and if he applies for re-employment within 90 days after being discharged from the armed forces.

A hospitalized war veteran has 90 days after his release from the hospital, provided he was not hospitalized more than a year.

Special features of the Frigidaire re-employment plan provides that all jobs are analyzed by department supervisors to establish a record of minimum physical requirements for each job.

Likewise, all job applicants, civilians as well as veterans, receive

thorough physical examinations by the company medical department to determine how their various physical qualifications compare with the physical requirements of the many different jobs analyzed.

The Frigidaire plan also provides definite procedures for placing job applicants who are physically handicapped on carefully selected jobs that they are able to handle. Then as their physical ability improves, special provision is made for their advancement to jobs suited to their improved physical condition, when such jobs are available.

### Victory Gardens Proved Home Freezer's Worth, Canadians Are Told

TORONTO, Ont.—Victory gardens have done a remarkable job in selling the buying public on the idea of low-temperature lockers, Phil Hedrich, sales engineer for the Universal Cooler Corp., told the second annual conference of the Ontario Frosted Food Locker Association.

"Victory gardens have proved a Godsend to all of us during the war years," he said. "Victory gardeners with low-temperature cabinets and frozen food locker storage space have learned that they can preserve their superabundance of foods for future use while they are most plentiful and at their prime best."

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Acme equipment is delivering  
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## How much would Electric Ranges cost ... if Cooking Units were made with Platinum?

You know their cost would be prohibitive. Approximately \$6,000 per range.

"Anyway," you might ask, "why should anyone even think of platinum in connection with electric ranges?"

Well, Frigidaire Research Engineers did! When they set out to develop the present Radiantube Unit of the Frigidaire Electric Range, they realized that platinum would be the ideal *natural metal* for sheathing this all-important unit. Since they couldn't use this precious metal, their task was to select—out of all the world's other metals and thousands of possible alloys—the *one best material to meet the rigid specifications they had set up.*

**Frigidaire Research found** the right material for the Frigidaire Radiantube Unit because it is equipped to do the job—to *do any research job that promises to improve any Frigidaire product!* Frigidaire maintains a complete Research Organization, with specialists in metallurgy, chemistry, mechanics, ceramics—in all the sciences concerned in Frigidaire products. And this organization, with all its skills and facilities, is supplemented by the vast resources of General Motors!

How the material that met the specifica-

tions of Frigidaire Research Engineers for the Frigidaire Radiantube Unit was found...how it was proved in rigorous tests that compressed 15 years of normal home usage into a single year—here is a striking example of Frigidaire Research in action!

**The complete story** of this research project is on file in Frigidaire's Research Department. The result of it is the nickel-chromium-iron alloy used exclusively in Frigidaire Radiantube Units, a remarkable material which—

- ✓ Stands up for the life of the range, through thousands of hours of operation at the extremely high temperatures required for today's high-speed electric cookery.
- ✓ Is so rugged that it withstands severe impacts even when red-hot—and still retains a flat, efficient surface.
- ✓ Is chemically stable: cannot cause the insulating material inside it to deteriorate.
- ✓ Will not flake, oxidize, or corrode, even when liquids and other materials are spilled on it.

### FRIGIDAIRE RESEARCH—AND FRIGIDAIRE DEALERS

When war needs permit, Frigidaire's Research Organization will *continue* its task of seeking out and developing the most promising of today's—and tomorrow's—wealth of new materials and methods, and of finding ways to adapt the best of them to Frigidaire ranges, refrigerators, home freezers, and other products. That's another important reason why the Frigidaire Dealer *knows* that the products he will offer his customers will continue to be *right*.

And the Frigidaire Dealer is sure of another thing, too. He *knows* that Frigidaire Engineering Leadership will continue to give him... *Selling Leadership!*

Look to Frigidaire for Leadership through  
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For Excellence  
ARMY \* NAVY  
in War Production

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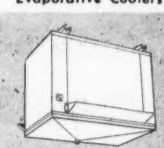
In addition, this new type of cooler eliminates warm-up effects, gives quick recovery, and actually doubles the cold water supply of ordinary coolers at peak periods.

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Spasaver Horizontal Coolers

## Cold Treating Improves Gages by Seasoning

(Concluded from Page 1, Column 4)

Production-type tests are run at regular intervals on a production unit such as an inverter, bringing it down to -68° F. and checking performance at that temperature, then raising the temperature to the upper limit and checking performance again.

Another application of this low-temperature cabinet is the seasoning of gages prior to finished grinding and lapping. Air-Way engineers have found that putting such a piece through a cycle of -100° F. to 158° F. several times helps to produce a better gage.

The cabinet in use at the plant was made by Kold-Hold Mfg. Co. and employs a 25-hp. condensing unit.

## Lou Block, Official of Electric Products, Dies

NEWARK, N. J.—Lou Block, superintendent of the marine division of Electric Products, Inc., York distributor here, died Feb. 1 of a heart attack.

For several years Mr. Block had been eastern sales manager for Kold-Hold Mfg. Co. of Lansing, Mich., and did considerable pioneer work in field applications of low temperature refrigeration. He also was active in the development of the two-bulb type thermostats now manufactured by Detroit Lubricator.

He was a member of the New York Section, American Society of Refrigerating Engineers, and the New Jersey chapter of A.S.M.E.

## Blood Asks 'Sensible' OPA Price Policy

NEW YORK CITY—Striking out at present policies of the Office of Price Administration and the government's "subsidizing" of cooperatives, Howard E. Blood, president of Norge Division, Borg-Warner Corp., asked OPA to take a more realistic viewpoint of reconversion and postwar pricing problems in a talk before the recent finance conference of the American Management Association here.

"It seems almost trite to say that, as soon as this horrible war comes to a point where there are substantial cut-backs in war orders, we must have extensive and rapid reconversion in the important durable consumer goods industries, in order to avoid serious unemployment," he declared.

"If we let nature take its course, this reconversion would probably be rapid, but would be accompanied by a bad price inflation in scarce goods, caused by attempts to cope with taxes, higher costs, and a scramble for higher wages and profits.

"If we let OPA take its present course, manufacturers will be forced to absorb unavoidably increased costs, or at best, to recover their costs without profit; and in cases where any relief at all is given manufacturers in order to absorb their costs, distributors will be forced to absorb the increase out of their margins," he predicted. "And in discussions of increased costs you will find profits taxes are ignored, as indeed they may well be if there are to be no profits.

"But how can business operate without profits? Henry Wallace himself couldn't think up any better scheme to undermine the foundations of a sound and prompt reconversion," he added. "Without either we can have neither.

"When any industry looks ahead to the days of reconversion and immediate postwar, and in dismay contemplates the effects of such a profit-pinching policy on its ability to do its part in re-employment, in getting the producing and distributing machine going at the tremendously increased rate necessary to provide all the needed jobs, and finds the powerful price control bureau deaf to the economic facts; what can the industry do about it?" asked Mr. Blood.

He then cited the attempts of 103 stove manufacturers to obtain permission to increase prices in order to meet rising costs of production and distribution. Because the group hired a publicity man to present the problems to Congress and the public, Chester Bowles, OPA chief, took to the air to charge these men with being "profiteers and inflationists," averred Mr. Blood.

"There is not slightest basis for the charge of 'profiteers and inflationists' in the action of these stove makers," said Mr. Blood. "They can't get him to listen to them and he says they should not go to the public or Congress. This narrows down the choice of places where he might tell them to go.

"Let's get some sense into this question of postwar prices of durable consumer goods, and any other goods similarly mishandled by OPA. Price ceilings should be held on such scarce goods at a point which absorbs the unavoidable increases in cost and prevents the inflation of profit margins but does not eliminate nor substantially reduce the profit margins. . . .

"Any assumption that goods will sell themselves and that the margins of distributors and dealers can be cut is as fallacious as the assumption

that manufacturing margins can be safely cut by the government," declared Mr. Blood.

"It has been demonstrated, I think, that a greater distributive effort than ever will be required to insure the greater consumption we must have. The rapid rebuilding of sales organizations and the retraining of salesmen should not be delayed or prevented by the government's reducing distribution margins," he emphasized.

"For OPA to recognize and respect the historic spread ratios between cost and selling price would not, I believe, increase prices beyond what is necessary to stimulated reconversion nor beyond the ability of the consumer to buy and would be a sound control of inflation."

Manufacturers of **COMMERCIAL REFRIGERATION**

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**Walk-In, Beer Dispensing and Beverage Coolers**

**BLUE RIBBON FARM MILK COOLERS**

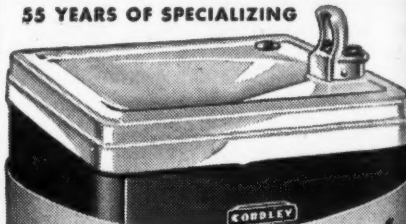
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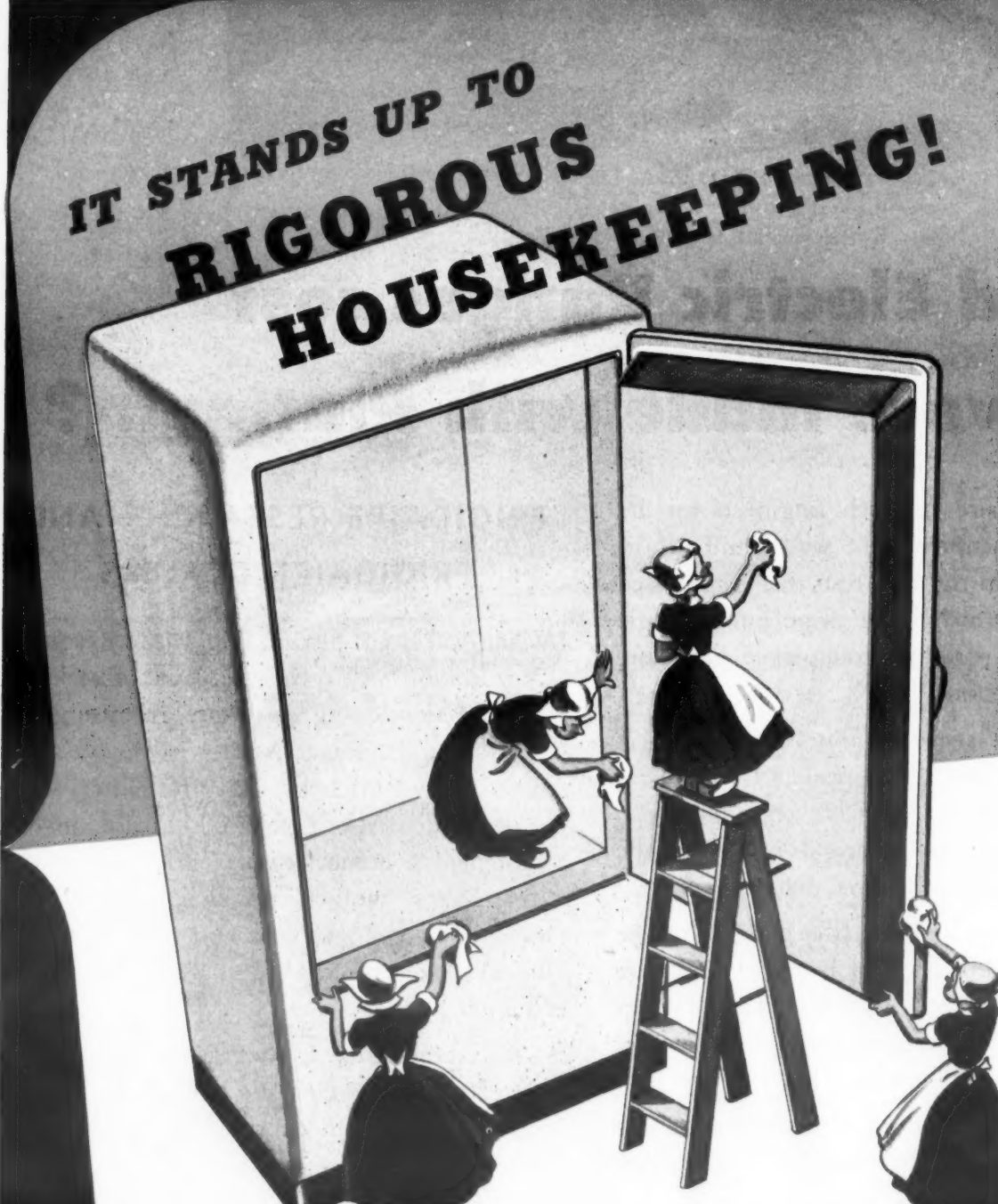
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They do not stain or spot. They take years of washing without in any way showing deterioration of finish.

There are many cool, pastel colors with deep, limpid surfaces. There may be patterns too, developed to your own specifications.

This is a simple method of putting style and selling punch into your old box for after the war. No re-designing or re-tooling is necessary. Just order the Formica and install in the usual way. It will be available immediately when re-conversion starts.

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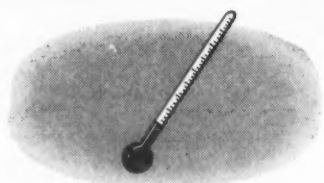


THIS VALVE OPERATES

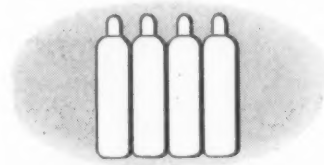
ONLY BELOW -30°F



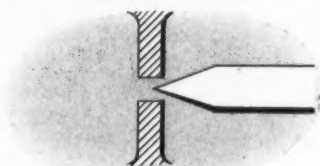
The No. 793 Differential Temperature Expansion Valve is engineered from start to finish for sub-zero work, and is not an adaptation of any former model. It is designed to work only on sub-zero temperatures from -30° to -150° and below.



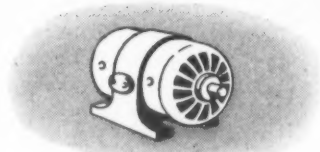
- Operated by temperature only, it is not affected by the pressure in the system.



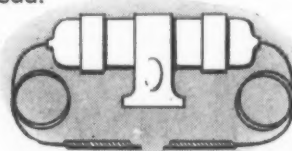
- One valve to work with any low pressure refrigerant not corrosive to brass. No need to order valves with special charging.



- Orifice sized to the operating load. No oversize orifice to cause flooding and surging during pull down periods.



- Valve remains closed above -30°; making possible the selection of a motor more nearly rated to the job, and preventing motor overload.



- Hermetically sealed power element is not affected by altitude or barometric changes.

*Specify*  
No. 793  
ON YOUR LOW  
TEMPERATURE JOBS  
*and get*  
Really SMOOTH  
Refrigerant  
Control

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Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

Canadian Representative — RAILWAY AND ENGINEERING SPECIALITIES LIMITED, MONTREAL, TORONTO, WINNEPEG

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# Inside Dope

By George F. Taubeneck

(Concluded from Page 1, Column 1)

## Unravelling the Tangle

In the meantime, however, refrigeration systems designed for "Freon" have been converted to methyl chloride. Countless others are now operating on mixtures of methyl chloride and dichlorodifluoromethane.

After normal seepage has occurred and these systems must be recharged, the question arises: How can the engineer determine whether or not methyl chloride has been introduced into a dichlorodifluoromethane installation?

This is an intriguing question, and one which a great many of our subscribers will soon encounter, if they haven't already!

So, we present herewith the answers—obtained after considerable research.

## How to Detect It

Methyl chloride can be hydrolyzed quite easily; but "Freon" can't. In a wet system methyl chloride eventually yields hydrochloric acid (often designated as "muriatic acid") which in turn forms compounds with metals to produce corrosive results.

Utilizing this observation as a starting point, the "detective" will seek to achieve a hydrolysis of methyl chloride in a methyl alcohol solution of piperidine. (Function of the piperidine is that of speeding up the hydrolysis.)

The hydrochloric acid thus liberated can be detected, of course, with silver nitrate.

Dichlorodifluoromethane cannot be hydrolyzed by piperidine under these test conditions, so there you have a perfect control factor. By pursuing

this test, so small an amount of methyl chloride as .5% by weight can be detected in less than 2 g. of refrigerant.

Any service man can have made up for his use in connection with such tests a kit which will do this job. A registered pharmacist can compound it. Here is the formula:

### Solution A (volume 7.4 ml):

1.0 gram (1.1 ml) piperidine  
5.0 grams (6.3 ml) methyl alcohol, C.P.

0.1 gram (0.1 ml) distilled water

In clean 6 dram glass vial rinsed with methyl alcohol, lead lined bakelite screw cap.

### Solution B (volume 11.3 ml):

0.1 gram silver nitrate, C.P.  
2.0 grams (1.4 ml) nitric acid, C.P., d 1.42

10.0 grams (10.0 ml) distilled water

In clean 4 dram glass vial rinsed with distilled water, oil paper lined bakelite screw cap.

Four inch length of clean 7 mm. (or 8 mm.) glass tubing, fire

polished at ends, rinsed with methyl alcohol.

Four inch length of clean ¼ inch rubber or synthetic rubber tubing, rinsed with methyl alcohol.

Methyl alcohol, distilled water, silver nitrate, nitric acid, vials and caps, and glass and rubber tubing are carried in stock by most scientific supply houses.

Piperidine may be ordered through any scientific company. It is advisable to use fresh piperidine of the best quality available. However, a yellow coloration is not harmful.

It will be convenient to make up some multiple of formula A in a clean glass stoppered bottle and accurately measure 7.4 ml of this solution into each 6 dram vial.

Likewise, a multiple of formula B may be made up in a clean glass stoppered bottle and a 11.3 ml portion of this solution added to each 4 dram vial.

One kit from each lot should be checked by mixing the two solutions and stirring with the glass tube. The mixture must be perfectly clear.

## Directions For Detecting Methyl Chloride

Provide a valved outlet and ¼-inch copper tubing from the vapor phase of the "Freon-12" system to be tested.

Open the valve slightly and clear the valve and the short length of copper tubing of liquid refrigerant and oil; then close valve tight.

Connect glass tube to the copper tube with the rubber tubing.

Support the larger vial (solution A) containing the piperidine in an upright position. Insert end of glass tube into the large vial so that the end of the glass tube is ¼ inch above bottom of the vial.

Carefully open refrigerant vapor valve until three bubbles per second are obtained.

Bubble refrigerant vapor through solution in large vial for 15 minutes.

Then add contents of smaller vial (solution B) containing silver nitrate slowly and carefully to the larger vial. Any turbidity, milkiness, cloudiness, or opalescence of the liquid means that this sample of "Freon-12" has been contaminated with methyl chloride or some other adulterant.

Only new or thoroughly cleaned and dried vials should be used, as vials cleaned and wet with chlorine treated water may give false results. Use new solutions for each test.

Vapor valve, to control refrigerant vapor bubbles must be opened slowly and care should be exercised to protect clothing and skin from the solutions. Also, large lens spectacles or goggles should be worn to prevent damage to the eyes. Silver nitrate and nitric acid are corrosive chemicals and may cause injury to the skin, eyes, and clothing.

## Refrigerator Baby Dies; Fund Closes

The baby born in the women's rest room of the C. V. Hill plant in Trenton, N. J., to an employee who refused to leave her machine until the last minute did not survive long.

Hence the "March of Dollars Fund for the Refrigerator Baby" inaugurated is now closing up shop. Please do not send any more.

It was gratifying, however, to note how many subscribers were touched by the incident and wanted to contribute. Several didn't limit their contributions to a dollar, but sent checks for more. One offered to contribute whatever else might be needed to make the fund a substantial gift in case only a relatively small number of subscribers responded.

There's a lot of good in this old human race yet and a lot of old hearts in the refrigeration industry.

## ANOTHER ADDITION TO THE AMCOIL LINE

The Amcoil Alservice Reach-In Panel Cooling Unit

### OVERALL DIMENSIONS

18" wide x 28½" high x 9" deep

Here's a compact, economical cooling unit for all utility refrigeration applications. Designed to occupy a minimum of space they are especially applicable for under counter as well as for replacements in old style display cases. Produces cooling temperatures down to 36° F.

MODEL RI 25.....2250 BTU capacity at 15° T.D.  
MODEL RI 30.....3000 BTU capacity at 15° T.D.

Larger models of this same type of unit designed especially for use in reach-in and small walk-in coolers are also part of this line.

MODEL RI 40.....5250 BTU capacity at 15° T.D.  
MODEL RI 45.....6150 BTU capacity at 15° T.D.

## DEALERS

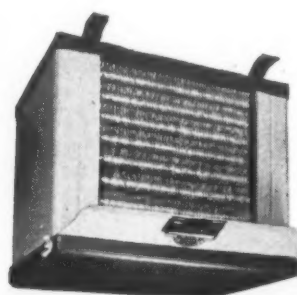
Profit by Quick Action With This Complete Line—Immediate Shipment From Your Local Jobber Or Direct From Us



AMCOIL COMFORTAIRE CONDITIONER—A new development in air-conditioning, this completely automatic unit creates cool, dry, comfortable air at a fraction of the cost of re-heat systems. This is made possible by the use of the new and novel latent cooler patents.



AMCOIL FOOD CONDITIONER. A wall mounted unit combining high, controlled humidities up to 85% with temperatures of from 35° to 40° F. Designed for walk-in boxes it automatically preserves foods without dehydration. Can be used effectively to store meats, fruits and vegetables, butter, cheese, eggs, flowers, bakers and confectioners products, to retard dough, etc.



AMCOIL ALSERVICE OPEN FACE COOLING UNIT. Is designed for efficient cooling and serves as a general utility unit in preserving foods and other commodities where a forced draft cooling unit is required. Streamlined design, in attractive grey and black color scheme, it can produce temperatures down to 34° F.

### MANUFACTURER'S REPRESENTATIVES

J. J. Madden, 212 Madison St., Dedham, Mass.  
J. E. Oliphant & Co., 305 Uhler Bldg., Marion, Ohio  
R. Barthelmess Sales Co., 1711 Chalmers Ave., Jacksonville, Fla.  
F. M. Eversden & Associates, 220 S. 16th St., Philadelphia, Pa.

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Patents Pending

### ALSO AVAILABLE NOW

AMCOIL Food Conditioner Reach-In Panel Unit  
A reach-in panel unit embodying the same principles of the already famous AMCOIL Food Conditioners. Designed for use in reach-in and small walk-in coolers, it combines cooling temperatures down to 36° F. with high controlled humidities, up to 85%.

MODEL RIF 38.....4600 BTU capacity at 15° T.D.  
MODEL RIF 43.....5500 BTU capacity at 15° T.D.

### NEW

REACH-IN PANEL ZEROBREEZE LOW TEMP. UNIT

TEMPERATURE RANGE +20° TO -20° F.

MODEL ZB 60 3900 BTU AT 10° T. D.

DIMENSIONS: 21" wide x 42" high x 9" deep  
AUTOMATIC ELECTRIC DEFROST



ZERO BREEZE LOW TEMP. UNIT. A low temperature unit equipped with automatic electric defrost... wall-hanging model... produces temperatures from +20° F. to -20° F. ... defrosts automatically on each off-cycle.



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Cable Address—AMCOIL

P. J. Burrill, 800 N. Clark St., Chicago, Ill.  
The Mac Silver Co., 547 S. Fairfax Ave., Los Angeles, Calif.

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Here it is—the kind of a refrigeration tools, parts, and equipment catalog you've always wanted. Put it by AIRO, of course. Write for yours today!

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**ELECTRIC RANGE**

**HOME HEATER**

A profitable line of  
major appliances  
all under one banner

Here is our pledge for the new year: Norge will continue the quality for which all Norge products are famous; Norge will continue to champion the independent distributor and dealer; Norge will jealously guard the reputation it now has among the trade for liberality and fair dealing. At the present time very few Norge products are available, but other models

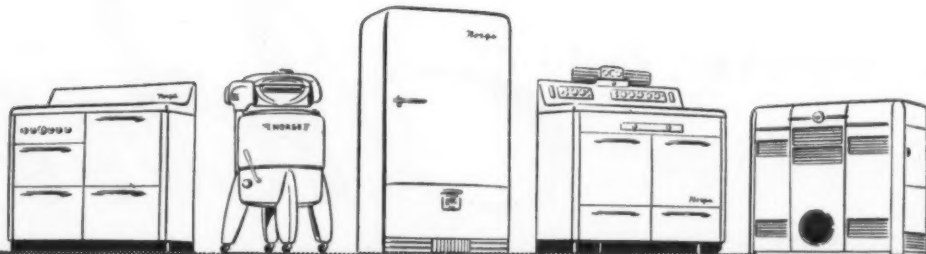
will follow and totally new products will be added to the line as fast as circumstances allow. . . . Thus the franchise to sell the major appliances grouped under the Norge banner will become more and more valuable!

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**DETROIT 26, MICHIGAN**

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BETTER PRODUCTS FOR A BETTER WORLD



# Text of Amended 'Freon-12' Order Eliminating Many Restrictions

**Editor's Note:** Conservation Order M-28, regulating the use of "Freon-12" refrigerant, has been amended, as reported in the Feb. 5 Bulletin Issue of the NEWS.

The changes consist of the revocation of paragraph (b) (2) of the order, and the inclusion of an additional sentence in paragraph (c), providing changes in the regulations under which deliveries by suppliers may be made. (These changes are printed in boldface in the following reprinting of the complete order.)

Use of "Freon-12," under the amended M-28 order, is now permitted for any refrigeration and air conditioning system except those included in List "A" of the order.

## MANUFACTURERS

We are interested in the wholesale distribution of refrigeration products through our large established dealers organization now or postwar.

We are well financed, have ample warehousing, trucks, stockrooms, competent employees, and large display facilities.

We welcome the opportunity to discuss with you the distribution of your products.

**N. O. NELSON CO.**

4306 Duncan Avenue

St. Louis 10, Missouri

## PART 1226—GENERAL INDUSTRIAL EQUIPMENT

[Conservation Order M-28, as Amended Jan. 29, 1945]

### DICHLORODIFLUOROMETHANE

The fulfillment of requirements for the defense of the United States has created a shortage in the supply of dichlorodifluoromethane for defense, for private account, and for export; and the following order is deemed necessary and appropriate in the public interest, and to promote the national defense.

§ 1226.27 Conservation Order M-28—(a) **Definitions.** For the purpose of this order:

(1) "F-12 gas" means dichlorodifluoromethane (sometimes called "Freon-12").

(2) "Person" means any individual, partnership, association, business trust, corporation, governmental corporation, or agency or any organized group of persons whether incorporated or not.

(3) "Producer" means any person engaged in the production of "F-12" gas.

(4) "Supplier" means any person to the extent that he is engaged in the business of distributing "F-12" gas to persons using the same for installation in refrigerating or air conditioning systems. The term shall include an equipment manufacturer to the extent that he engages in the sale of "F-12" gas which has not been installed in such systems. "System" means any "system" as defined in General Limitation Order L-38.

(5) "Equipment manufacturer" means any person to the extent that he uses

"F-12" gas for charging new refrigerating or air conditioning systems or parts of systems manufactured by him. It does not include affiliates, subsidiaries, branches, divisions or sections, or an enterprise, if not actually engaged in the manufacture of systems or refrigerant containing parts of systems.

(6) "Insecticide manufacturer" means any person to the extent that he uses "F-12" gas in the production of insecticide.

(7) "User" means any person who installs "F-12" gas in a refrigerating or air conditioning system, other than an equipment manufacturer. It includes suppliers, service agencies, owners or lessees, to the extent that they engage in installing "F-12" gas in any system.

(8) "Contract agent" means any person to whom or for whose account "F-12" gas is delivered by a producer for distribution to suppliers.

(If the same person, or two or more branches, divisions or sections of the same enterprise, acts in two or more capacities as contract agent, supplier, equipment manufacturer, or insecticide manufacturer, the particular provisions of this order which apply to the respective activities must be followed, to the extent to which the various provisions are applicable to each activity.)

(b) **Systems for which no deliveries are permitted.** (1) No person (including users, dealers, and other suppliers, and producers) shall deliver, or accept delivery of, any "F-12" gas for use in, or for resale for use in any new or used system which is of a type referred to in List A. Exceptions from this restriction may be authorized in the following cases (although this does not preclude appeals under paragraph (f) (4) in other cases):

(i) When the major portion of the space to be air conditioned is used as a radio broadcasting studio, auditorium, hotel, restaurant, cafeteria, school, office or office building, or department store, and one of the following conditions exists: The building is "windowless" or one in which the windows cannot be

opened for ventilation (such as glass brick, or glass set in a fixed frame which was built into the surrounding wall in an immovable way); or the rooms needing air conditioning are interior ones having no other means of adequate ventilation and are either served by a separate system or constitute a major portion of the space regularly occupied by persons and are served by one central system; or

(ii) When the system is used to air condition a room or rooms in a single family residence or a single apartment and its continued operation is essential to protect the life or restore the health of a person suffering from a serious ailment or disease and under care of a licensed physician, and a statement to that effect by such physician is also furnished with the application referred to below.

Application for WPB permission to get "F-12" gas for such a use should be made by the owner or operator of the system by letter in duplicate (or in an emergency, by wire confirmed immediately by letter) to War Production Board, General Industrial Equipment Division, Washington 25, D. C., Ref. M-28 giving the address and a description of the building (s) in which the system is located and stating the extent to which the system comes within either of the cases described above, the quantity of "F-12" gas needed, and the name and address of the probable supplier. The authorization, if granted, will be sent to the applicant, who should show it to his supplier when requesting delivery, in addition to furnishing the certification required under paragraph (c) (2) below.

(2) [Revoked Jan. 29, 1945.]

(3) Attention is called to paragraph (c) (2), which prohibits a supplier from delivering "F-12" gas except on certified orders.

(c) **Deliveries by suppliers.** (1) No supplier or any other person (except a producer) shall deliver any "F-12" gas for export outside of the continental United States, or for use by any of the following non-retail users (or to any ship yard or other person for use in a system to be delivered to any of them), namely: The Army, Navy, Maritime Commission, War Shipping Administration, post exchanges, ships service departments and activities, equipment and insecticide manufacturers, for new or used systems, or for use in insecticide, without specific authorization from the War Production Board. Subject to the foregoing restriction, any supplier or any other person (except a producer) may deliver "F-12" gas to any other person, for use in any new or used system not referred to in List A of this order.

No person shall accept from a supplier or other person any delivery of "F-12" gas which is prohibited by the restriction in this order.

(2) Whenever the owner of a system or any other user wishes to obtain "F-12" gas for installation in a system or systems for which deliveries by suppliers are permitted under this order, he may place his order with any supplier for the minimum quantity which the available cylinder or cylinders permit, necessary to bring the charge in the system or systems up to a normal operating charge. He must certify his order, or the vendor's delivery receipt, by a certificate endorsed on or attached to it, showing that the "F-12" gas is to be used for such purposes only and that he is not holding any empty cylinders not owned by him, which shall be in substantially the following form:

The undersigned purchaser certifies to the seller and the War Production Board that he does not have any "F-12" cylinders not owned by him, which have been empty for more than 15 days; and that the "F-12" gas covered by this order will not be used or resold for any purposes not permitted by Order M-28.

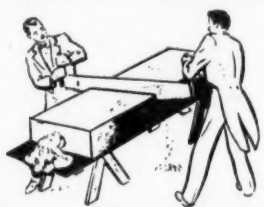
The standard certification in the form described in Priorities Regulation 7 cannot be used instead of that described above. Such certificate, which must be signed by the purchaser or his authorized official, will constitute a representation that what is stated in it is true. A supplier must not deliver any "F-12" gas except under certified orders; and he must not make delivery under any order which is certified if he knows, or has any reason to believe that the certificate furnished with such order is untrue, incomplete, or inaccurate. In such a case the supplier must reject the order, and should explain why he is doing so, so that the prospective purchaser can comply with this order. Each supplier must keep all accepted orders and certificates which he receives, for a period of two years, for inspection by the War Production Board. (Certificates in the form required by this order before its amendment on November 12, 1943, may continue to be used for 30 days after that date, in place of the above form.)

This restriction shall not prevent a person who services several systems for which deliveries are permitted by this order from purchasing a cylinder of "F-12" gas from a supplier, if the amount purchased is the smallest quantity practicable considering the sizes of the standard commercial cylinders and the amount needed in his current operations.

(3) No "standby charge" or any other quantity of "F-12" gas, over and above that needed to bring the total charge in a system or systems up to the normal operating charge, shall be delivered to or accepted by any person for use in a system which he owns, leases, or operates (except the Army, Navy, Maritime Commission or War Shipping Administration); except, however, that a "standby charge" may be maintained for a system which is operated primarily for one of the following purposes: air conditioning or refrigeration for the production and storage of penicillin, or blood serum; or refrigeration for the storage of blood for plasma, or the production or storage of blood plasma.

(d) **Deliveries by producers.** Each producer shall hold his entire inventory of "F-12" gas, together with all additional quantities produced or otherwise obtained by him from time to time, for delivery under such orders and for such uses as may be authorized or directed from time to time by the War Production Board. No deliveries of "F-12" gas shall be made by a producer except pursuant to specific authorizations or directions heretofore or hereafter issued by the War Production Board.

(e) The provisions of this order shall (Concluded on Page 9, Column 1)



There's magic in DUAL TEMP, too!

## 2 REFRIGERATORS IN 1!

**1 A Separate, Insulated HOME FREEZER...**  
at 37° Below Freezing

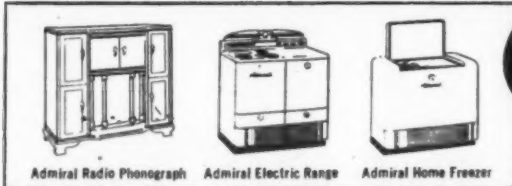
**2 A Purified, Moist Cold FOOD COMPARTMENT...**  
at 5° Above Freezing

Yes, there IS magic in DUAL TEMP... selling magic for the peacetime days ahead. Just open the door and everything your customer wants in a refrigerator... everything you need to make a sale... is there! A built-in HOME FREEZER that really quick freezes... stores 80 pounds, nearly two bushels of frozen food for months. A Purified Moist Cold Compartment that keeps food fresh and moist... no space stealing coils, NO MESSY DEFROSTING, no covered dishes and no "ice box odors." Sterilamp ultra violet ray action controls odors, kills bacteria, retards mold growth.

DUAL TEMP is miles ahead of competition in every selling feature. It's YOUR appliance leader for greater postwar profits... so Get Aboard with Admiral. Admiral Corporation, Chicago 47, Illinois.

TUNE IN: CBS Sundays, 2:30 P.M., EWT, for Admiral's "World News Today."

And Remember, Only



# Admiral

Can Build a DUAL TEMP



## Text of Amended 'Freon-12' Order

(Concluded from Page 8, Column 5)

be followed by every producer, contract agent, supplier, user, equipment manufacturer, insecticide manufacturer, and any other person buying, selling, or delivering "F-12" gas, without any regard to any preference ratings which have been assigned or which may hereafter be assigned to particular contracts or orders.

(1) **Miscellaneous provisions.**—(1) **Applicability of regulations.** This order and all transactions affected thereby are subject to all applicable regulations of the War Production Board, as issued and amended from time to time.

(2) **Reports.** (i) Each equipment manufacturer who wishes to secure delivery of "F-12" gas during any month for charging systems or parts produced by him, or for factory repair and charging of sealed or hermetic condensing units, shall file with the War Production Board, on or before the 15th day of the preceding month a report on Form WPB-3326, prepared in accordance with the instructions for such form.

(ii) Any person wishing to secure "F-12" gas during any month for ultimate uses (such as testing coaxial cable for leaks) other than the charging of new or used refrigeration or air conditioning systems or parts or use in insecticide, shall file with the War Production Board, on or before the 20th day of the preceding month, a report by letter, in triplicate, showing the minimum amount required for the month, the purpose for which required, and the amount used during the preceding calendar month for that purpose.

(3) **Violations.** Any person who willfully violates any provisions of this order, or who, in connection with this order, willfully conceals a material fact or furnishes false information to any department or agency of the United States is guilty of a crime, and upon conviction may be punished by fine or imprisonment. In addition, any such person may be prohibited from making or obtaining further deliveries of, or from processing or using, materials under priority control, and may be deprived of priorities assistance.

(4) **Appeals.** Any appeal from the provisions of this order, or any direction thereunder, shall be made by filing a letter in triplicate, referring to the particular provision appealed from and stating fully the grounds of the appeal.

(5) **Communications.** All reports to be filed and other communications concerning this order should be addressed to: War Production Board, General Industrial Equipment Division, Washington 25, D. C., Ref. M-28.

Issued this 29th day of January, 1945.

War Production Board,  
By Joseph Whelan,  
Recording Secretary.

The reporting requirements of this order have been approved by the Bureau of the Budget in accordance with the Federal Reports Act of 1942.

### LIST A—SYSTEMS FOR WHICH NO DELIVERIES ARE PERMITTED

**Air conditioning systems.** Any system, of any size operated or installed for the purpose of lowering the temperature and/or humidity of air in any building, room, or other enclosure used as, or located in any of the following:

- Amusement parks.
- Animal hospitals.
- Auditoriums.
- Ballrooms, dancing studios and dance halls.
- Bank and loan associations.
- Bars, cocktail lounges, and beer parlors.
- Bowling alleys.
- Concert halls.
- Funeral parlors.
- Golf clubs, country clubs, athletic clubs, and all other clubs and club houses.
- Hotels and apartment houses.
- Moving picture houses.
- Night clubs.
- Office buildings and offices, public or private.
- Railway, streetcar and bus stations and terminals.
- Residential buildings and dwellings of all kinds.
- Restaurants, cafeterias, and other places selling meats, food, or beverages.
- Schools.
- Service establishments, such as laundries, cleaners and dyers, tailor shops, barber shops, "beauty" parlors, automobile sales and service shops, and repair shops of all kinds.
- Skating rinks.
- Stores, selling any kind of products, material or merchandise, at retail or wholesale (excluding manufacturing establishments).
- Studios of all kinds.
- Theaters.

This list does not include (i) any such system used primarily to air condition a building, room or other enclosure used chiefly for purposes not listed above, or (ii) any system designed, necessary and used, in substantial part, for the refrigeration and storage or processing of food, ice, or other materials or products, necessary to life or health, or to be delivered to the Army, Navy, Maritime Commission or War Shipping Administration, and requiring refrigeration temperature control, or freedom from dust or other impurities.

**Refrigeration systems.**  
Refrigeration systems solely for storing or dispensing carbonated or malt beverages.

INTERPRETATION 1  
INTERPRETATION 1: REVOKED  
NOVEMBER 12, 1943.  
INTERPRETATION 2

(a) Quantities which may be obtained by system owner. Subparagraphs (c) (2) permits the owner (or lessee) of a refrigerating or air conditioning system (not on List A) who does his own installation

of "F-12" gas, to place his order for the minimum quantity "which the available cylinder or cylinders permit" necessary to bring the charge in his system up to a normal operating charge.

The standard commercial cylinders are generally available in sizes which contain four pounds, ten pounds, twenty-five pounds, and one hundred forty-five pounds of the gas, and a particular supplier may not have all four sizes in stock at all times. Questions will therefore arise as to the number and sizes of cylinders which the owner of a system is permitted to obtain if the particular supplied with whom his purchase order is first placed should not happen to have the sizes of cylinder from which the minimum quantity needed by the system can be furnished the owner.

In such a case, the owner of the system should make a reasonable effort to obtain the minimum quantity which he needs, from some other supplier in his locality, rather than purchase an excessive quantity from the first supplier upon whom he calls. While the order does not prescribe rigid rules as to exactly what effort the purchaser should make in every case, it is required that he do whatever is practicable, under his particular condi-

tions, to obtain the minimum quantity which he needs, and no more.

Where he is located in a large community in which there are a number of suppliers, he should contact several, if necessary, in order to obtain the quantity needed. If he happens to be located in a small community where there is only one supplier who cannot furnish the exact quantity needed and the "F-12" gas must be obtained immediately in order to avoid spoilage of a substantial quantity of food, the restriction would not prevent him from obtaining a larger amount, if that is unavoidable without letting his food spoil.

As a guide to the number and size of cylinders which should normally be obtained, for the different quantities of "F-12" gas which may be needed in different cases, the following table is furnished:

Pounds of "F-12" Gas Required	Amounts which should be ordered—Number of Cylinders—			
	4 Lbs.	10 Lbs.	25 Lbs.	145 Lbs.
0-4 .....	1	1	1	1
5-9 .....	1	1	1	1
10-14 .....	1	1	1	1
15-24 .....	2 or 1	1	1	1
25-29 .....	1	1	1	1

30-39 .....	1	1	1	1
40-49 .....	1	2	1	1
50-59 .....	1	1	2	1
60-69 .....	2	2	2	1
70-79 .....	1	3	3	1
80-89 .....	1	1	3	1
90-110 .....	1	1	4	1
111-145 .....	1	1	1	1
146-170 .....	1	1	1	1
171-195 .....	2	1	1	1
196-220 .....	3	1	1	1
221-245 .....	4	1	1	1
246-290 .....	1	2	2	1
291-315 .....	1	2	2	1
316-340 .....	2	2	2	1
341-365 .....	3	2	2	1
366-390 .....	4	2	2	1
391-435 .....	3	2	2	1

The above interpretation applies only where the system owner buys his "F-12" gas from a supplier, and installs it himself. If he has a service shop install the gas, the shop will always be able to furnish no more than the amount actually needed, from its service cylinders, and there will be no problem.

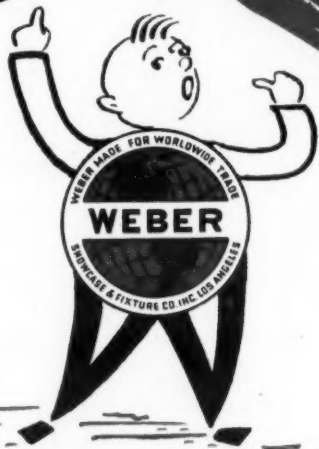
(b) **Installation of "F-12" gas in systems or parts held by equipment manufacturers or dealers.** Paragraph (b) (1) prohibits deliveries of "F-12" gas for systems on List A; (b) (2) prohibits deliveries for

any other system, unless it must be operated under one or more of the conditions specified. These restrictions are intended to prevent deliveries of "F-12" gas where there is a sale or other delivery of the gas. They prevent an equipment manufacturer or other person from delivering "F-12" gas in any new or used system or refrigerant-containing parts if charged with "F-12" gas furnished by him after the effective date of the applicable restriction, for any prohibited use.

These restrictions do not prevent the withdrawal and reinstallation of "F-12" gas in the course of repairing a used system or refrigerant-containing part, where no additional "F-12" gas is added to what was already in the system or part.

Neither do they restrict the delivery of new or used systems or refrigerant-containing parts which had already been charged at the time the applicable restrictions became effective nor do they prevent the owner or lessee of any installed system who had "F-12" gas in his possession on the effective date of the applicable restriction from charging the system with such gas, or having someone else do this charging for him, where no transfer of possession or ownership is involved. (Issued November 30, 1943.)

# WHEN YOU'RE Profit Planning THINK OF WEBER



**PROFIT-PLANNING** is of utmost importance to you and your business future—and Weber's better-designed, better-engineered and better-built refrigeration and soda fountain equipment offers you the line of merchandise you need to capture a dominant position in the lucrative post-war market. Forty-seven years' manufacturing experience and an outstanding peace and war-time record enable Weber to offer you the latest advancements in store equipment. These sensational Weber products offering many new revolutionary features are on the way:

- Commercial Refrigerator Display Cases
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- Walk-In Coolers
- Soda Fountains
- Roll-A-Door Frosted Food and Ice Cream Cabinets
- Household Frosted Food Cabinets

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# WEBER

## SHOWCASE & FIXTURE CO. Inc.

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to fly Army-Navy "E" Flag, to Build  
World's largest knock-down self-contained refrigerators, to make portable walk-in refrigerators.  
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Los Angeles, California  
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Kindly send me complete data on the Weber franchise for the \_\_\_\_\_ Territory  
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Position \_\_\_\_\_  
Address \_\_\_\_\_



## WPB Stresses Proper Care of Appliances

WASHINGTON, D. C.—Proper care of radios, refrigerators, washing machines, stoves, and all electrical and mechanical appliances is more important today than ever before, the War Production Board's Office of Civilian Requirements warned Feb. 1 in a message to householders.

The increased need for war production means a delay in resuming production of household appliances

and equipment, OCR officials said. This factor, combined with the acute shortage of repair shop facilities, makes it imperative that every effort be made to prolong the life of equipment now in use, they emphasized.

The tremendous demand for repair services, occasioned by the lack of new appliances and equipment, together with the shortage of skilled repairmen, frequently means several

weeks or even months of delay in having repairs made.

Small motors that operate power-driven appliances or equipment are sturdily built for years of satisfactory operation, but excessive overloads and lack of proper lubrication will sooner or later cause a breakdown. New motors are scarce, and repair service, highly technical in nature, is generally much slower than usual.

Here are OCR's suggestions for the care of some of the more commonly used equipment:

### Refrigerators:

Don't cause the motor and operating mechanism to run almost continuously in warm weather by neglect of a few simple things. Small motors and certain refrigeration parts are very scarce. Refrigerators, with gas under pressure, require highly skilled repairmen for service work, and there is a shortage of such repairmen.

With the advent of warm weather, do some spring housecleaning if the operating mechanism of your refrigerator is of the open type (easily accessible). Oil the motor as directed on instruction sheet or card. Take a brush and clean the fin-like gadget (the condenser) that looks like an automobile radiator. Heavy dust is a menace. Shut off the electricity before doing this.

Don't let too much frost accumulate on the coils. Defrost before it gets 1/4 inch thick.

Do not use a sharp instrument to remove ice trays.

Don't pack food in tightly, nor use a lot of paper sacks that may tend to prevent proper air circulation.

Don't leave the door open any longer than necessary.

Allow several inches of free air space behind the refrigerator so that the hot air will be dissipated quickly.

Don't put hot water in the trays, nor hot foods in the refrigerator.

**Editor's Note:** The accompanying suggestions on care of appliances prepared by OCR should be brought to the attention of householders. Service firms might have them printed on postcards or other mailing pieces for distribution to their customers.

### Washers:

Don't overload the washer or wringer. A little more time will pay in the end.

Seven to 12 minutes is usually long enough for a good washing job.

Oil as per instruction card or sheet. Examine clothes and remove matchsticks, nails, bobby pins, etc., before putting clothes in the washer.

Start motor before putting in clothes, except when using automatic washers.

The correct water level should be maintained.

Don't run metallic objects through the wringer, unless they are protected.

Release pressure on wringer rolls after using.

Keep oil and grease off rubber parts.

### Irons:

Don't clean by washing in water. Wipe with damp cloth, and mild cleaning powder.

Don't overheat, as this may damage the heating element, and new elements are scarce.

Be sure to disconnect when through using. It is surprising how many persons forget this. Don't wrap connecting cord around a hot iron. Be careful not to drop the iron.

### Extension and Iron Cords:

Keep free from kinks, knots, oil, and moisture.

Keep away from radiators or metal pipes.

Have frayed cords repaired promptly. If you have to do this, use rubber tape.

Don't hang over nails, or wrap around a hot appliance.

Don't run under heavy furniture or rugs.

Don't jerk cord from appliance or outlet. Always grasp the plug itself.

### Vacuum Cleaners:

The high-speed motor needs oil. Follow manufacturer's instructions.

Don't run over pins, nails, or metal objects; pick these up before using cleaner.

Empty dust bag frequently. Don't wash it, but brush well occasionally.

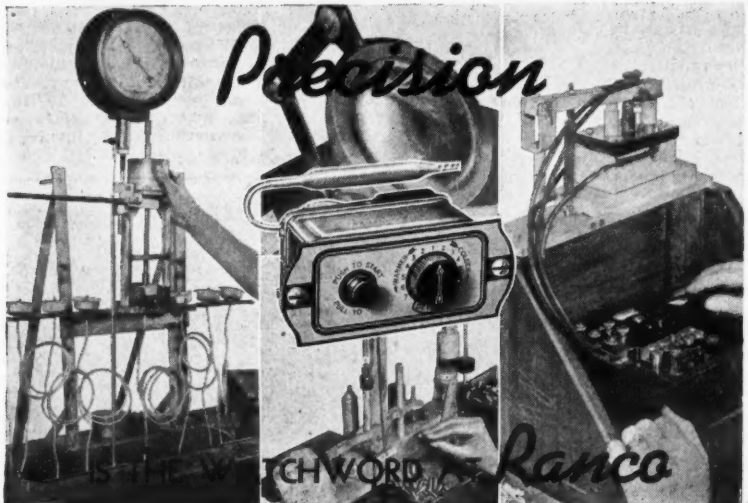
Remove hair or threads from the brushes.

### Fans:

At the beginning of season clean and oil before starting to use. If fan won't start, disconnect and spin the blades by hand to loosen oil. Keep clean. Keep papers, cloths, or other objects away from rotating blades.

### Miscellaneous Appliances:

Keep water from heating elements, and don't jab them with any metal object, whether they are connected or disconnected. Watch connecting cords for wear. Follow oiling instructions for motor-operated appliances.



The precision construction of Ranco Refrigeration Controls assures dependable, extremely accurate instruments of long life. Each part is so carefully constructed that operation is smooth and instant. In addition Ranco Domestic Controls are beautifully designed and sturdily constructed with stainless steel bases, top frames and side covers. That is why you can be proud and confident when you install Ranco.

### WORK WITH YOUR RANCO JOBBER

Your Ranco jobber is well acquainted with the complete line of Ranco commercial and domestic replacement controls.

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## one of America's most Famous Cartoonists BUILDS FUTURE SALES FOR THE NEW COOLERATOR

DEALERS! WRITE NOW FOR ALL THE FACTS!



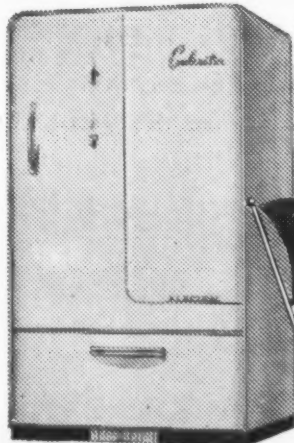
...SHE WON'T BUDGE...  
SAYS SHE'S WAITING  
FOR COOLERATOR  
with the MAGIC FLAVOR-  
SAVER!

DEALERS... A PROTECTED PROFIT PLAN IS NOW  
WAITING FOR YOU AT YOUR DISTRIBUTOR'S  
(he's listed below). SEE HIM, OR WRITE THE  
COOLERATOR COMPANY, DULUTH 1, MINNESOTA!

### THESE FIRMS ARE DISTRIBUTORS FOR AMERICA'S LARGEST SOLE SPECIALIST IN HOME REFRIGERATION

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Cleveland, O., Cleveland Radioelectric, Inc.  
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Houston, Texas, Straus-Frank Company  
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Indianapolis, Ind., Appliance Distributors, Inc.  
Jacksonville, Fla., Consolidated Automotive Co.  
Kansas City, Mo., Enterprise Wholesale Furn. & Stove Co.

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Louisville, Ky., Ewald Distributing Company  
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Nashville, Tenn., Keith Simmons Company, Inc.  
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New York, N. Y., D. W. May Corporation  
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Oklahoma City, Okla., Jenkins Wholesale Division  
Omaha, Neb., G. W. Onthank Co.  
Philadelphia, Pa., Elliott-Lewis Electrical Company  
Phoenix, Ariz., Albert Mathias Co.  
Pittsburgh, Pa., J. A. Williams Company  
Portland, Ore., Bargell Supply  
Providence, R. I., Providence Electric Company  
Richmond, Va., Wyatt-Cornick, Inc.  
Rochester, N. Y., Bickford Brothers  
St. Louis, Mo., Stanley Distributing Company  
Salt Lake City, Utah, Refrigeration Serv. & Eng. Co.  
San Antonio, Texas, General Hotel Supply Company  
San Diego, Calif., Gough Industries, Inc.  
San Francisco, Cal., McCormack & Company  
Schenectady, N. Y., LeValley, McLeod, Kinkaid, Inc.  
Seattle, Wash., Seattle Radio Supply, Inc.



Sioux Falls, S. D., G. W. Onthank Co.  
Spokane, Wash., Prudential Distributors, Inc.  
Springfield, Mass., The Burden-Bryant Co.  
Syracuse, N. Y., Paul Jeffrey Company  
Toledo, O., Walding, Kinnan & Marvin Co.  
Utica, N. Y., Horrocks-Ibbotson Company  
Vincennes, Ind., Ebner Ice & Cold Storage Company  
Washington, D. C., May Hardware Company

**NEW  
Coolerator**

**COOLERATOR COMPANY  
Duluth 1, Minnesota**

**BUY MORE WAR BONDS!**

## AUDEL'S REFRIGERATION and AIR CONDITIONING GUIDE JUST OUT! 4 Books in One!

Covering:  
1. Basic Principles, Servicing, Operation, Repair of Household Refrigeration Units  
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A gold mine of essential information for ENGINEERS, USERS AND SERVICEMEN. Here you have at your finger's ends a complete library in ONE VOLUME. The necessary data you have been looking for on: MODERN REFRIGERATION SYSTEMS, REFRIGERANTS, Including Freon, Quik-Freeze, Lockers, Water Coolers & Air Conditioning Systems.

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MAIL: AUDEL'S NEW REFRIGERATION GUIDE for free examination. If O.K. I will send you \$1 in 7 days; then \$1 monthly until price of \$4 is paid. Otherwise I will return it.

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## Texas Supplier Holds 'First Annual Clinic'

BEAUMONT, Tex.—Standard Brass & Mfg. Co., refrigeration supply jobber here, late last month held its "First Annual Refrigeration Clinic" for members of the industry throughout the East Texas and Louisiana territory.

Approximately 100 refrigeration distributors, dealers, and service men from this area attended.

The Clinic, under the direction of Burl Boykin, Jr., assisted by Alan L. Cody, began in the morning with a display of the presently available equipment.

Following lunch the representatives of manufacturers assembled at the speaker's table, together with two representatives from the Houston office of WPB. Each of the manufacturers' representatives gave a five minute talk on the present and probable future availability of the various types of equipment.

D. D. Langdale of WPB gave an interpretation of the WPB orders affecting the refrigeration industry. The meeting was then thrown into open discussion when questions were solicited and answered by the speaker's group.

The afternoon session was followed by a cocktail hour and a dinner, after which the meeting ended with informal discussions.

The following representatives of manufacturers were present:

George Wilson, Henry Valve Co.; W. H. Knox, Detroit Lubricator Co.; Harry Pearson, Imperial Brass Mfg. Co.; Jack Baugher and Norman Munday, Gates Rubber Co.; Jerry Wilkerson, Dole Refrigerating Co.; John Hendrix, Dayton Rubber Mfg. Co.; R. P. Waite, Penn Electric Switch Co.; Barney Arbuckle, Virginia Smelting Co.; C. E. Boren, Ranco, Inc.; Thurston Sevar, Cutler-Hammer, Inc.; E. W. Montgomery, Lynch Mfg. Co.; W. H. Cody, manufacturers' representative; Art Ways, manufacturers' representative.

## WPB Changes Basis for Water Heater Makers

WASHINGTON, D. C.—WPB has amended water heater order, L-185, to bring it in line with present policies.

The amended order eliminates any reference to the percentage of base year production of electric water heaters that may be produced. By removing this percentage reference, production can be increased or decreased in accordance with approved programs without requiring changes in the order itself. Production is still rigidly controlled, however, by means of special authorizations from WPB and is programmed according to the stated needs of claimant agencies.

Production of non-electric water heaters still is permitted for each manufacturer at a certain percentage of his unit production of the same classification of water heater for his base year (1941), it was pointed out. Special authorizations from WPB are not required for this production. The amended order does specify,

however, that manufacturers of non-electric water heaters may produce only 25% of their yearly quotas during any one calendar quarter. This action was taken because it was felt that the critical manpower situation necessitates keeping quarterly production at a minimum in order that manpower may be used in production of other essential equipment, WPB said.

The amended order also provides that applications from manufacturers who have not previously produced water heaters will be accepted and processed on the same basis as all other applications.

## John Pauling Victim Of Heart Attack

CHICAGO—John W. Pauling, 55, of Minneapolis, vice president of the Minneapolis-Honeywell Regulator Co., who was widely known in the housing and heating industry, died suddenly Jan. 17 while in Chicago on business. He suffered a heart attack and was pronounced dead at Wesley Memorial Hospital.

## California Jobber Gets 60-Day Suspension

SACRAMENTO, Calif.—A 60-day suspension order has been invoked by the War Production Board against the local branch of Hinshaw Supply Co., refrigeration jobber also operating an outlet in San Francisco.

The suspension, which went into effect Jan. 27, does not affect the San Francisco branch, but the latter cannot extend any customers' preference ratings on orders taken at the Sacramento branch.

WPB charged that the Sacramento branch had delivered approximately 109 fractional horsepower motors between Jan. 12 and April 28, 1944 on orders not bearing preference ratings required by L-123; that the branch had delivered 66 new refrigeration coils and 36 new refrigeration compressors on unapproved orders, violating L-38; and that the branch had applied preference ratings for approximately 155 coils and 68 condensing units in excess of the number of preference ratings the branch had received, violating Priorities Regulations 1 and 3.

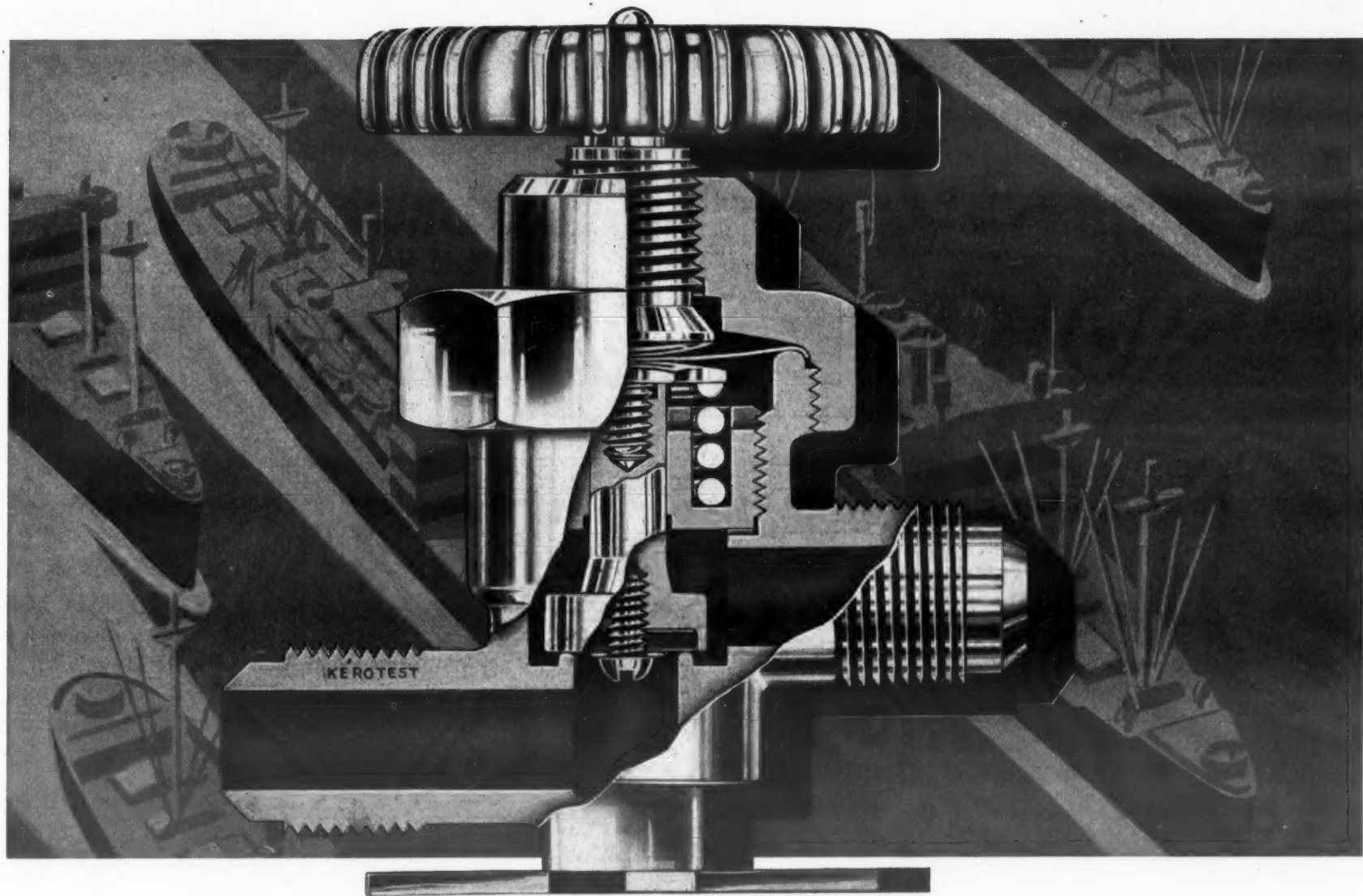
## NEW TYPE REPLACEMENT SEAL SPARTON and TRUKOLD

Eliminate Old Bellows Type Cup Seal

Write for Descriptive Literature and Price

**WOOLSEAL CORPORATION**  
293 EAST 149TH STREET BRONX 51, N. Y.

# Chosen for Proven Reliability KEROTEST Valves



## Protecting Vital Food Supplies in Victory Ships and Troop Carriers

... another reason why KEROTEST is a preferred supplier of Air Conditioning and Refrigeration Valves for so many important manufacturers.

When the new, standardized, factory assembled, ships stores refrigeration system was recently developed for the Maritime Commission—the units had to embody every new development in the industry to provide maximum trouble-free,

dependability, compactness—KEROTEST was chosen to supply precision control Brass Valves.

These advanced engineering facilities are available for your present or peacetime Valve requirements.

**KEROTEST MANUFACTURING CO.**

PITTSBURGH 22, PA.

Valves • Fittings • Accessories

ORIGINATORS OF THE PATENTED DIAPHRAM PACKLESS VALVE



## GOOD NEWS!... when it comes . . . but are you ready for it?

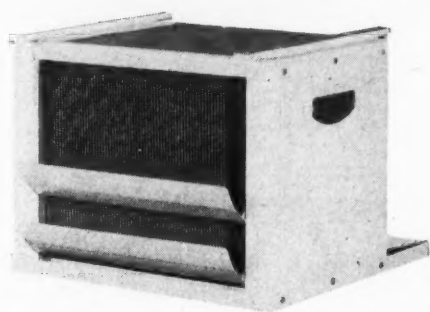
Don't be caught napping! Get set for the huge post-war market with a distributor franchise to sell Sherer's A to Z Commercial Refrigerator line.

Juicy steaks, garden-fresh vegetables, fish, fruit and wild game will be frozen in Sherer Freezers by thousands of Americans on farms, in stores and rural homes the country over. These freezers, and display refrigerator cases of all kinds, will be available when restrictions are removed — reach-in refrigerators, walk-in cooling rooms, and other commercial refrigeration products, as well as the Sherer Distributor franchise are available now! Sherer—a pioneer manufacturer of fine commercial refrigerators, today serving our country with all types of refrigerators for the armed forces and essential civilian requirements, offers you a franchise on its complete line. Write or wire for details!

**SHERER**  
-GILLET CO.  
MARSHALL, MICHIGAN



## FILTERPURE UNIT COOLERS



Post-war models with copper and aluminum coils are now in production.

Many new engineering improvements plus tops in performance and eye appeal make them the outstanding unit cooler on the market today.

Write or wire for complete information.

**BETZ CORPORATION**  
Hammond, Indiana

## More Than 300 Tons of Refrigeration Capacity Installed In Plant For Big Scale Penicillin Production

### Cooling Used In Almost Every Stage of Process, Done in Air Conditioned Rooms

NEW YORK CITY—More than 300 tons of installed refrigeration capacity are used in the manufacture of penicillin, the "wonder cure" for many dread diseases, in the new plant of Commercial Solvents Corp. at Terre Haute, Ind., reported Clifford F. Holske of the Vilter Mfg. Co. in a talk at the A.S.R.E. convention.

The "deep fermentation process" used by Commercial Solvents Corp. is one which permits production of penicillin on a commercial scale.

This process, as Mr. Holske explained, starts in a fermenter. Corn steep liquor, a byproduct of the corn refining industry, is sterilized and placed in a fermenter. Sterilization must be complete, for it is all-important that there be no growth of any organism other than "Penicillium notatum."

Then the culture medium in the fermenter is inoculated with some of the pure culture that has grown in seed tanks under laboratory control, selected on the basis of its ability to give high yields of penicillin.

Carefully controlled temperatures

are an important factor in limiting the fermentation period to the proper time of five to six days. Refrigerated cooling water is circulated through the fermenter jackets to maintain the temperature (73° F.) required for optimum growth and yield. Sterilized air forced through the fermenter charge throughout this operation agitates the fluid which helps maintain a uniform temperature. Such agitation increases the yield, and the air serves the further purpose of furnishing oxygen required for the development of the mold which is aerobic.

#### Cooling After Fermentation

When the fermentation process has proceeded to the point at which the maximum production of penicillin can be expected, the liquid is withdrawn from the fermenter for further processing. As the liquor leaves the fermenter, the mycelia are filtered off and discarded, and the solution which is left, containing minute quantities of penicillin, is cooled to about 40° F.

It is then pumped into an adsorption tank where the penicillin and other constituents are adsorbed by activated carbon. The slurry containing the carbon is filtered and the filtrate discarded. The carbon is then treated with a solvent in the elution tank. Next the penicillin bearing solvent is filtered to remove the carbon, then discharged into a water jacketed storage tank pending solvent extraction.

The solvents are then separated out and recovered and the extract treated with sodium bicarbonate. After the final extraction, the sodium penicillin salt solution is carried through a plate and frame filter for the removal of suspended matter, particularly any pyrogens that might be present. The solvent is recovered in a standard recovery system.

Next step, which consists of pumping the solution into sterile bottles, is carried on in air conditioned rooms.

This air conditioning system is equipped with a bank of "Sterilamps" to avoid the possibility of circulating polluting bacteria or molds.

The bottles have a capacity of 22 c.c., but only approximately 2 to 3 c.c. of solution is placed in each bottle, the exact amount depending on the degree of dilution.

#### Bottles Chilled at -40° F.

Held securely in metal grids, the bottles are frozen at -40° F., the freezing time being less than 10 minutes, and subcooled to very low temperatures to avoid the possibility of thawing during subsequent handling.

Freezing at such low temperatures is desirable in order to reduce crystal size to facilitate the final drying as well as to accelerate the rate of handling, thus decreasing the time during which the somewhat elusive and highly perishable penicillin is retained in aqueous solution.

The freezing operation is carried out in a 32° F. room, and a room held at -6° F. is provided for storage after freezing.

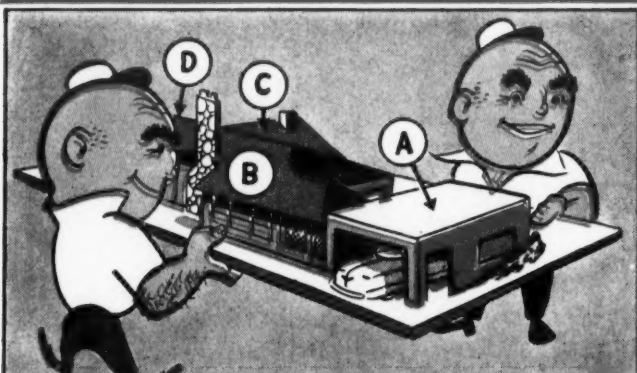
Following this freezing operation, the product is ready for lyophilizing, a process of reduction to a concentrated dry salt through elimination of the water content of the mixture by sublimation. This process is necessarily carried on in an atmosphere having an extremely low water vapor pressure and is effected at total pressures of less than 200 microns.

#### Surface at -70° F.

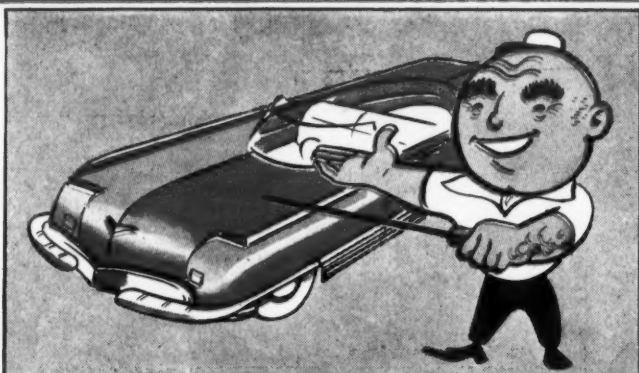
Temperature of the frozen mass must be kept below the freezing point. Control of the water vapor pressure is secured by the exposure of chilled condensing surface in the low pressure area of the drying system. This surface is maintained at

(Concluded on Page 13, Column 1)

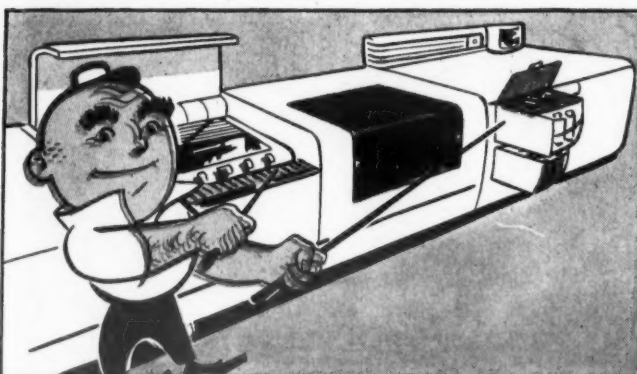
## BUNDYWELD IN EVERY HOME



**A** THE MODERN American home is served with many appliances and conveniences equipped with Bundy steel tubing . . . appliances and conveniences which give the American family the highest living standard in the world.



**B** The family car (and incidentally most trucks on the road, too) may have an average of twenty Bundyweld parts—fuel lines, oil lines, brakes tubes, and many miscellaneous small parts.



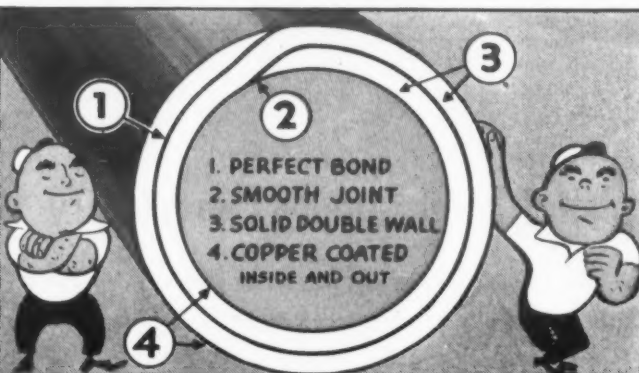
**C** In the kitchen, the gas range probably has flash tubes, pilot lines, and connecting tubes of Bundyweld. And for the electric refrigerator's condenser, Bundyweld is pretty much standard throughout the entire industry.



**D** Wherever the food freezing and storage unit may be—basement, utility room, or a complete separate room, it, too, may have many Bundyweld Tubing parts similar to those in the electric refrigerator.



**E** Water and space heating units are apt to use Bundyweld for pilot lines, connector and feeder tubes—in fact anywhere a tube in Bundy's range of sizes is required.



**F** ALL THESE USES are not just accidental. They are because industry recognizes that the solid, double wall construction of Bundyweld—on exclusive Bundy feature—meets every test for superior performance.

## BUNDY TUBING

ENGINEERED TO YOUR EXPECTATIONS

### BUNDY TUBING DISTRIBUTORS AND REPRESENTATIVES:

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Maspeth, New York City, N. Y.

Lapham-Hickey Company  
3333 W. 47th Place  
Chicago 32, Illinois

Rutan & Company  
112 South 16th Street  
Philadelphia 2, Pennsylvania

Engle Metals Company  
3628 East Marginal Way  
Seattle 4, Washington

## Service Engineers Should Know . . .

### "VIRGINIA" METHYL CHLORIDE IS REALLY LABORATORY TESTED

— the content of each and every container —  
large or small — is analyzed 3 separate times.

#### BOILING POINT TEST

1. A measured sample from each cylinder must be water-white in color and when boiled to dryness must record within 25/100 of 1 degree a constant boiling point of minus 23.8°C. This test detects unwanted hydrocarbons, dirt and oil impurities.

#### ACIDITY TEST

2. The acid content in a sample of known weight must not exceed 6 parts per million; low acidity prevents copper plating and oil sludging.

#### MOISTURE TEST

3. The moisture in a sample of known weight must not exceed 80 parts per million; — low moisture prevents freezing at expansion valve and refrigerant break-down.

The name "V-METH-L" on the cylinder is your guarantee of quality. Sold by refrigeration supply jobbers everywhere.

## VIRGINIA Smelting Co.

WEST NORFOLK, VA.

76 BEAVER ST., NEW YORK 5 — 131 STATE ST., BOSTON 4  
Agents for Kinetic's "Freon-12" — "Freon-22" — "Freon-11"



## -70° To Plus 73° F. Cooling Is Used In Penicillin Production

(Concluded from Page 12, Column 5)

-70° F. or lower in order to secure satisfactory sublimation rates.

Air conditioning is widely used throughout the plant to provide complete control of temperature, humidity, and air purity in the manufacturing areas, and also to provide proper conditions for the rabbits, mice, and other laboratory control animals used in testing the product. The rabbit house has a 35 ton air conditioning system.

The primary refrigeration equipment, as described by Mr. Holske, consists of three 10½ x 10½ inch two-cylinder Vilter vertical single acting ammonia compressors, synchronous motor driven.

A 12,000-gal. water cooling tank is used to provide cold water for all high temperature cooling applications, including air conditioning. A Baudelot-type water cooled solution cooler is used to reduce the temperature of solution leaving the fermenter.

Water in the tank is cooled by a bank of Vilter superflooded raceway coils with accumulator and ammonia float control. A belt-driven horizontal agitator maintains the required water velocity over the coil surface.

Compressors cycle on this load controlled by pressure switches set at progressive cut-in points. Under normal operation these machines also serve as the second stage of compression for three 4½ inch x 4½ inch two-cylinder vertical single acting compressors used to control the low temperature rooms and the freezing tank.

A special piping arrangement makes it possible to operate two of these compressors as a two-stage unit on the freezer of any of them as single-stage units discharging directly to the condensers. This latter method of operation is desirable when the freezer is not in operation as the gas discharged into the suction main by the small machines may cause undue cycling of the main units at light loads.

Brine spray units control the temperature of the -6° and 32° F. rooms.

All evaporators are equipped with accumulators and float controls. Solenoids on liquid and suction lines, thermostatically operated, maintain the desired temperatures.

In listing the amount of installed refrigeration capacity, Mr. Holske pointed out that in consideration of possible increases in capacity or plant operation, equipment was provided for loads considerably in excess of maximum calculated loadings, and compressor capacity was apportioned generously in view of the fact that no spare compressor was provided.

Installed refrigeration capacity was listed as follows:

Process water cooling, 244 tons; cold rooms, 10 tons; freezer, 5 tons; main building air conditioning 40 tons; rabbit house air conditioning, 35 tons.

## 'Complete' Rebuilding Job on Units Makes Them Liable To Tax

WASHINGTON, D. C. — Firms which completely rebuild household refrigerators for immediate or eventual resale are subject to the manufacturers' excise tax, according to a ruling (ST 927) of the Treasury Department's Bureau of Internal Revenue appearing in the bureau's bulletin No. 1942-42.

If the refrigerator is rebuilt for a person regularly engaged in the business of selling such articles, the seller becomes liable for the tax on his sale or exchange of the refrigerator, the ruling states.

The tax is not intended to cover "repair" work, as distinguished from "rebuilding," however, as is shown in the ruling:

"In general, any person who acquires ownership of unserviceable junk, scrap, or salvage materials or units, and dismantles such materials or units into their component parts, discarding the unserviceable parts and assembling the serviceable parts, with or without the addition of new parts, into serviceable units or articles which he places in stock for future sale or exchange, is a manufacturer or producer . . . and is liable for tax on the sales of such units or articles.

"However, liability for tax . . . is not incurred where articles subject to the manufacturers' excise taxes are merely cleaned, painted, adjusted, or repaired by replacing minor parts which are worn or broken. Likewise, no liability for tax is incurred in connection with any work done for a customer which is in the nature of an immediate repair job.

"The tax does not apply in any case where an article is repaired or rebuilt under a contract for labor and materials, but if the article is rebuilt (not merely repaired) for a person regularly engaged in the business of selling such articles, such person incurs liability for the tax on his sale or exchange of the article."

The ruling states further that "where a used article is accepted as part consideration in exchange for a rebuilt or reconditioned article which is subject to tax, the amount or value allowed for such used article must be included in the sale price of the taxable rebuilt or reconditioned article in computing the tax with respect to the sale or exchange thereof."

## Navy Reports Death Of F. C. Houghten, Ventilation Engineer

WASHINGTON, D. C.—The Navy Department has announced the death on Jan. 25 of Commander Ferry C. Houghten, well-known ventilation engineer. He was attached to the research division of the Navy Bureau of Medicine and Surgery, and was in Boston on a special assignment. He was commissioned in the naval reserve in 1942.

A year ago Commander Houghten was the recipient of the F. Paul Anderson Medal of the American Society of Heating & Ventilating Engineers, of which he was research director until 1942.

## British Columbia Plant To Add 1,200 Lockers

ABBOTSFORD, British Columbia. —Construction has begun on the addition to the Abbotsford cold storage plant here. The addition will increase the plant's present capacity of 609 lockers by 1,200 new lockers, each 8 cu. ft. in capacity.

A contract for installation of a new freezing unit and additional equipment, valued at \$4,800, has been undertaken by the Canadian Ice Machine Co., Ltd., located in Vancouver, B. C.

REVERE Dryseal Copper Tube for refrigeration is sold through distributors everywhere.

This picture shows Revere Dryseal Tube being specially treated to remove all moisture. At the end of this process the inside is completely clean, and dehydrated or dry. After dehydrating, the tube is sealed and you receive it bright and bone-dry. This is of course important in refrigeration applications since the slightest amount of moisture may combine with some refrigerants and induce corrosion in the tubes.

A number of other special "kid glove" treatments assure the absolute suitability of Revere Dryseal Refrigeration Tube for its purposes. Great care is exercised to keep the tubes free of oxides through every manufacturing step, including anneal to dead softness in a special atmosphere, and the final deoxidation. Furnished in coils of 25, 50 and 100 feet, and in sizes from 1/8" to 3/4" o.d., wall .035".

Also available for refrigeration and air conditioning—Revere Sealed Copper Tube, each end plugged and taped for protection against injury and contamination. Available in types K, L and M. For Revere Dryseal or Sealed Copper Tube, see your distributor.

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In the field of refrigeration, Universal Cooler applies the principle of All-Purpose Engineering to the design of refrigerating units for scores of uses.

Your refrigeration products will soon invade vast new markets. Broadening applications will call for more versatile, adaptable refrigerating power. With that in mind, Universal Cooler engineers have applied a quarter century's experience to designing a new line of compact, performance-tested refrigerating units. With manufacturers in every phase of refrigeration, the swing is to . . .

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Dealers everywhere are ringing up tidy profits by supplying rugged, long-lived, efficient Gilmer Belts. Gilmers are built to give the best service to the user and are always goodwill builders for you. Order through your jobber today.

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Division of United States Rubber Company



THE SYMBOL OF  
**Modern**  
REFRIGERATION  
CONTROL



MODERNIZE YOUR REFRIGERATION SYSTEM  
WITH **"MH" Heavy Duty FRIGISTAT**  
MINNEAPOLIS-HONEYWELL REGULATOR CO.

## Special Equipment Had to be Devised For First Chambers

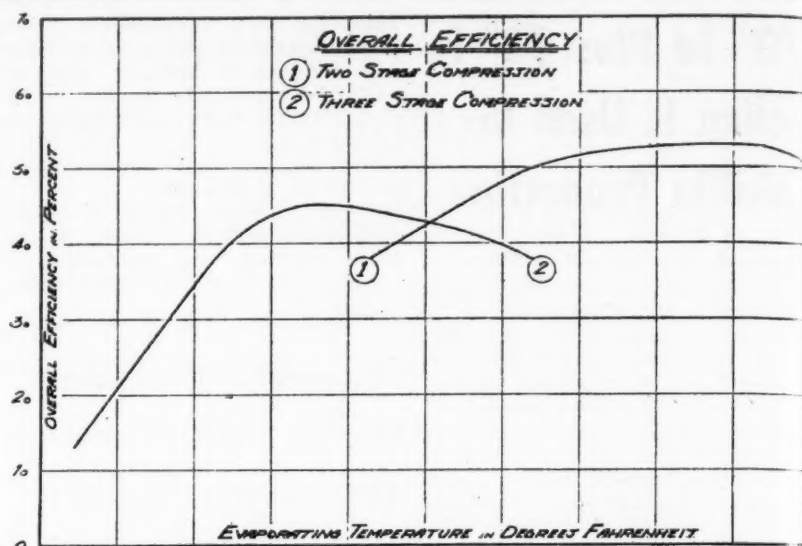
(Continued from Page 1)

sure, temperature, and humidity," Mr. Ludwig pointed out.

"The operating conditions which can be obtained vary from requirements for production testing of instruments, radio equipment, and other small controls to highly specialized apparatus for conducting research. In many cases satisfactory measuring instruments which would indicate conditions achieved in the test cabinets were not available.

"In order to attain low temperatures, low pressures, and variable humidities a few unusual problems arose because of the combination of refrigeration and high vacuum technique. It was necessary to conduct many experiments and to build a great number of test models before a satisfactory design could be obtained.

"The development of special equipment for duplicating conditions experienced at high altitude was not feasible because of the extreme urgency of making available to the



A comparison of the overall efficiency of two-stage and three-stage "Freon-12" compressor hookups for low-temperature work is shown in this graph prepared by Erwin Ludwig, chief refrigeration engineer of Mobile Refrigeration Division, Bowser, Inc., Woodside, Long Island, N. Y. According to this graph, two-stage systems are most efficient between -40° and -80° F. while the three-stage units reach peak efficiency between -100° and -110° F.

aircraft industry for production testing test chambers which would satisfy the requirements of the industry.

"Commercially available compressors, controls, refrigerants, and the usual good practice in fabrication methods were combined for good results. With minor modifications incorporated in the few commercially available items which were not satisfactory, consistently good performance was maintained," he said.

"Three refrigerants are used for refrigerating most of the high altitude test chambers. 'Freon-12' is very satisfactory for temperatures to -80° or 90° F. 'Freon-22' can be used to extend the useful operating range of the same compressors to -120°. For temperatures below -120° propane is more satisfactory and condenses at a lower pressure than 'Freon-22'.

"Propane has one serious disadvantage because it is combustible, both 'Freons' being non-combustible. A satisfactory refrigerant for exceedingly low temperature applications should have a low condensing pressure at room temperature, a high evaporating pressure at the low temperature, and a low vapor volume at the low temperature.

"Standard piston type compressors have been used with the above refrigerants and their performance has been satisfactory even after many years of service. By using these same compressors with lighter

valves, high pressure lubrication systems and reduced clearance volumes lower temperatures can be reached.

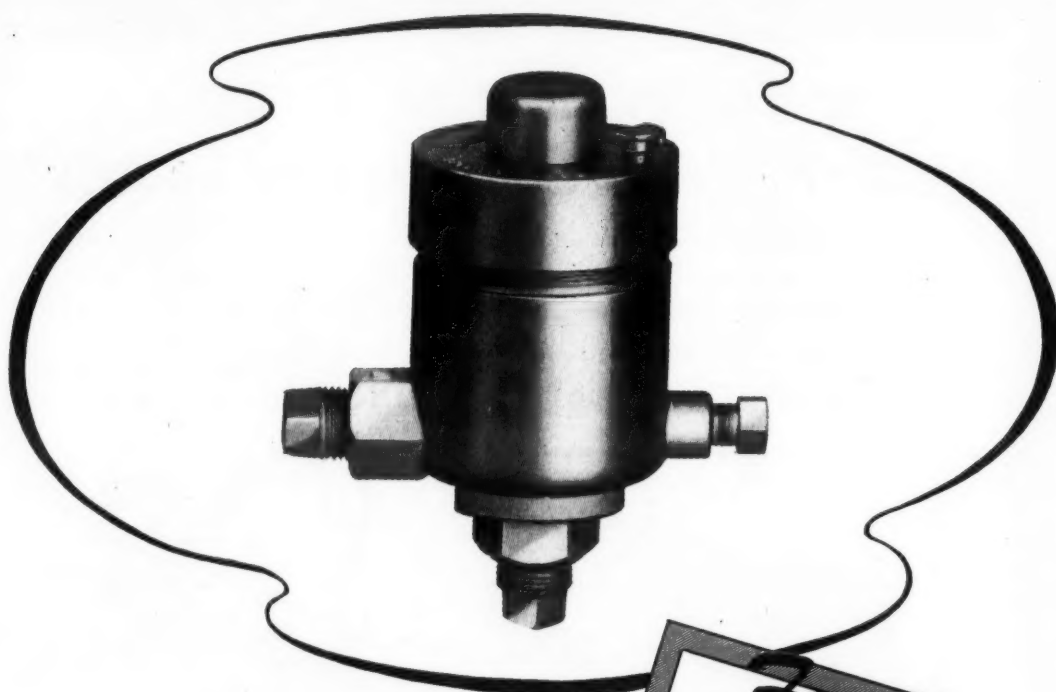
"Single stage application can be used for attaining temperatures to -40° or -50°, two stage to -80° or -90°, and three stage for temperatures below -100° F. The efficiency of two and three stage compression is good, provided sufficient intercooling is done between stages. Based on 'Freon-12' as a refrigerant, the overall efficiency of two stage compression is over 50% between evaporating temperatures of -40° and -75° F. and drops off rapidly at lower and higher temperatures.

"A three stage compression system has a definite peak efficiency of 45% at the evaporating temperature of -100° to -105° which drops off to less than 15% at -135° and below 40% at evaporating temperatures above -80° F. For operating at temperatures outside of the range of peak efficiency very poor results are obtained, and the compressors must be greatly over-sized necessitating large drive motors in order to carry the load during the peak periods.

"An increase of approximately 15% at -110° is found when propane is used as a refrigerant in the same compressors. At an evaporating temperature of -130° F. the gain is even more, amounting to a little more than 20%. Thus it can be seen

(Continued on Page 15, Column 1)

# CONSTANT CONTROL WITH *Temprite* VALVES



### Features

- 1 Easy to adjust
- 2 Easy to install
- 3 Wide range of adjustment
- 4 Close temperature control
- 5 Extreme sensitivity
- 6 Rugged and dependable

WHEN Temprite Constant Pressure Two-Temperature Valves are used, constant temperatures are assured at all times and the performance of the refrigeration system is greatly improved.

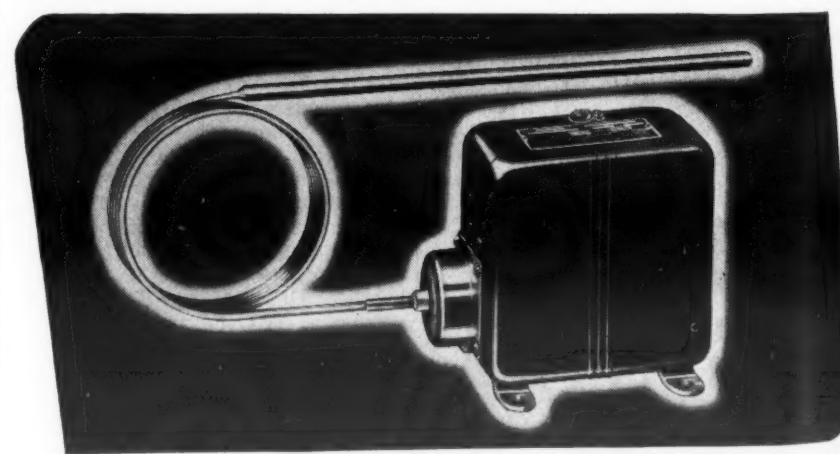
Sensitive operation, perfect sealing seat and rugged construction are essential features for a satisfactory two-temperature valve and it is these features that account for the Temprite Valves' unflinching performance.

The Temprite Two-Temperature Valve is an essential part of any multiple type refrigeration system and is also recommended for use on single applications where closer and more constant regulation is required than can be furnished by the condensing unit control switch.

Remember, no refrigerating system is better than its control and the preference of refrigeration engineers for the Temprite Constant Pressure Two-Temperature Valve is the logical result of its outstanding performance in general commercial work.

These Temprite Valves are available in four sizes to permit the best selection for your particular application.

For complete specifications and prices on Temprite's Constant Pressure, Two-Temperature Valves write or wire our Sales Department today.



## Proper Temperature Control ... SAVES!

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But get the full story on AVRGAIRE, complete with pictures and diagrams. Write Penn Electric Switch Co., Goshen, Ind. Export Division: 13 E. 40th St., New York 16, U.S.A. In Canada: Powerlite Devices, Ltd., Toronto, Ont.

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FOR HEATING, REFRIGERATION, AIR CONDITIONING, ENGINES, PUMPS AND AIR COMPRESSORS

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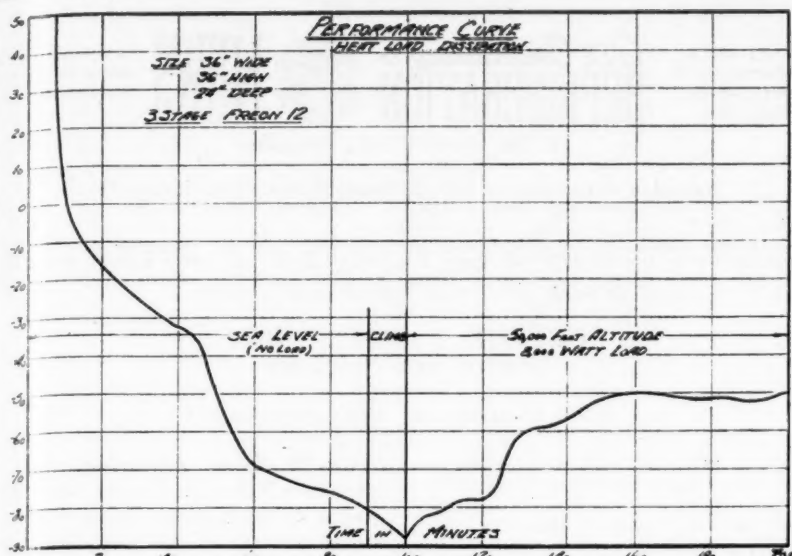


Liquid Cooling Devices

43 PIQUETTE AVENUE

DETROIT, MICHIGAN





How a three-stage "Freon-12" refrigeration system cooling an altitude chamber performed on one test at sea level with no load and during a "climb" to 50,000 ft. altitude under an 8,000 watt load is shown in the above graph.

## Numerous Changes Were Required to Adapt 'Commercial' Equipment to Altitude Units

(Continued from Page 14, Column 5) that when operating temperatures below -100° F. are desired, propane is a much more suitable refrigerant," declared Mr. Ludwig.

"By far the greatest insurance of good low temperature performance of a compressor has been reduction of clearance volume. This has been accomplished by the trade by selective fitting of gaskets of different thicknesses between crankcase and cylinder block and between cylinder block and head. A test was made on a two stage compression refrigerated altitude chamber to see what effect a variation of clearance of volume would have on the minimum temperature attained.

"With a clearance volume of 2% of the cylinder displacement, a temperature of -88° F. was the minimum achieved. By the addition of a

thicker gasket between the cylinder head and valve plate increasing the clearance volume to 7%, the lowest temperature attained was -76° F.

"A comparative test was also run to determine the difference in performance between 'Freon-12' and propane refrigerants when used in the same altitude chamber. When propane was substituted, the cooling period from ambient to -68° F. was reduced from 100 minutes to 45 minutes and the low temperature operating point was reduced 18° to 20°. No other changes in the system itself were made," he explained.

"Another critical item which is necessary for satisfactory refrigeration performance is the refrigerant control. A dry expansion type system with a thermostatically controlled valve was found to be most satisfactory. Commercially available valves of this type were sensitive enough but were built with high internal friction. Compensating springs were also designed for higher temperature applications where the refrigerant pressures encountered are higher.

"One type control, a diaphragm-operated thermostatic valve with a single compensating spring was found to operate best. Three tests were run with this type of valve to determine the performance of the unit at very low temperatures. The standard control valve required 3.5 lbs. to open the valve .015 inch. The lowest temperature at which this valve would control satisfactorily was at -80° F. evaporating temperature.

"If the temperature was reduced below this value serious cycling resulted and poor control was obtained. The temperature of the suction gas at the control bulb of the valve was taken at 10-second intervals. The standard valve did not control at all below -80° but cycled between -117° F. and -85° F. When the compensating spring pressure was reduced to .8 lbs. for .015 inch travel the control was excellent down to -108° where the temperature variation was held within 3° F.

"A further reduction in spring pressure to .5 lb. for .015 inch travel gave very poor results as the pressure was not any longer sufficient to overcome the internal operating friction. Thus by changing the spring characteristics of a standard thermostatic refrigerant control valve

very good control down to -110° was obtained with 'Freon-12.' Due to the higher evaporating pressure of propane, the range was extended to -160° when this refrigerant is used.

"Heat exchange surfaces as used in ordinary commercial applications were found to be satisfactory. In order to obtain the greatest efficiency from the heat exchange surfaces, a combination of extended surface (finned type) evaporators with flat plate type surfaces was used," said Mr. Ludwig.

"The construction of the pressure tight chamber was very easily designed around the available steel plate evaporators. By using a finned evaporator coil inside the chamber a very quick air temperature reduction was made possible while the chamber walls were cooled directly by the refrigerant. In order to properly observe equipment under test good visibility must be provided into the cabinet.

"Tempered glass panes for carrying the full operating pressure bonded to a number of thinner glass panes for thermal insulation can now be provided as a single unit for use in inspection windows. No fogging occurs as all of the glass panes are sealed to one another by means of metal air tight seals.

"It has been found necessary to use high temperature solders and bracing alloys to prevent failure of joints when subjected to rapid temperature changes and low temperatures along with mechanical load and vibration. The above briefly describes the departure from standard construction which was necessary to obtain satisfactory performance from commercially available equipment used in altitude chamber."

(To Be Continued)

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## For ALL these services!

- **Insoluble**—Stays put; will not wash out
- **Seals Permanently**—Fills clearances and imperfections
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### NATIONALLY ENDORSED

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Attractive lettering of your name on pad at \$2.00 each extra.

For carrying your refrigerator more safely and easily, use the Mastercraft Adjustable Carrying Harness which is a separate unit from the pad and priced at \$8.50 each.

Write for complete folder and prices on pads for refrigerators, washers, ironers, ranges, radios; also furniture pads and protective covers. . . . All prices subject to change without notice.

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**EASY TO CARRY EASY TO USE**

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**CONSERVE IRREPLACEABLE REFRIGERANT GASES**

Ask Blotorch Bill

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NEWTON LOWER FALLS 62, MASS.  
Manufacturers of Soldering Equipment Since 1919  
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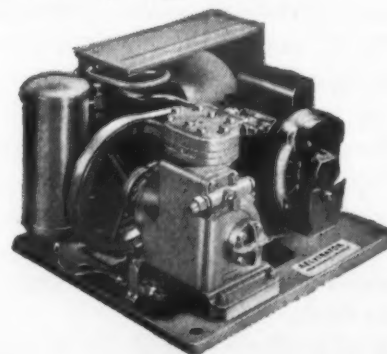
**Happy Tales of Trouble-Free Performance**

1st Cook: "What's going on here?"

2nd Cook: "Why, even the vegetables are happy over our new Kelvinator Condensing Unit!"

For 30 years Kelvinator Condensing Units have given more dependability, more economy, more performance . . . that is the reason progressive service men always specify Kelvinator.

Kelvinator distributors and zone offices stock a complete line of refrigeration supplies. See them for your installation material such as valves, fittings, dryers, etc.



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CONDENSING UNITS  
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VOLUME 44, No. 7, SERIAL NO. 830, FEBRUARY 12, 1945

## Don't Forget the G. I. In Your Advertising!

ALTHOUGH the several hundred Army and Navy refrigeration engineers who read AIR CONDITIONING & REFRIGERATION News each week (the War Department pays for subscriptions to the News for every Army Post Engineering Battalion; the Navy refrigeration specialists must order it on their own) write us chiefly about specific technical problems they are encountering, scarcely a week passes but that one or two of these G.I. engineers sends us his comments on items he finds in our paper which, at first glance, you might think would be of interest only to civilians.

For example: the advertisements.

Notwithstanding the fact that Uncle Sam is practically the only customer for the refrigeration equipment being manufactured in record-breaking volume today, at least 60% of the advertising which appears in AIR CONDITIONING & REFRIGERATION News currently seems to be slanted toward a home-front audience.

This is perhaps as it should be. Advertisers are acutely aware of the fact that their products-in-use are wearing out too rapidly, and can't be replaced. They can't be blamed for wanting to protect their precious Good Name by detailing valuable suggestions, in their advertising, for keeping their products in good repair and satisfactory working condition.

Most G.I. refrigeration engineers recognize the urgent necessity of this standard copy theme. Yet they resent it, in a way, too. They want, as they try to explain it in letters to us, to be addressed more often. After all, they're winning this war for us; and they're receiving and using the vast bulk of all refrigerating machinery being produced today.

"Why don't advertisers recognize that servicemen are their big users now and will probably be their big customers after the war?" ask many of our G.I. subscribers.

Along with these complaints relating to neglect, these G.I. correspondents make some pointed criticisms. Especially are they miffed about advertisements which claim that "Woofed Widgets are Winning the War." Wotinell, ask our fighting men, could Woofed Widgets do by themselves? Who is doing the shooting; who is getting shot at; who is risking life and limb?

Our Boys are happy that you advertisers have won the Army-Navy "E" pennant; they're glad you have exceeded production schedules. But why in the name of the Seven Souful Saints shouldn't you have made a good record? We're all in this war together, wanting to win it as fast as we can, aren't we?

And another thing: bragging advertisements leave the impression that products manufactured for the Army and Navy leave your factory in such perfect shape that all the G.I.'s have to do is uncrate them and plug them in—ha ha! These G.I.'s know what lengths they must go to in order to keep your products working. They realize how unusual and unprovided for climate-conditions can change a carefully-worked-out operating chart, and can accelerate deterioration.

Another gripe: artwork picturing soldiers and sailors tailored and groomed in impeccable taste, flawlessly spic-and-span.

"Don't they know," wrote one subscriber from Italy, "that we're frightfully dirty and dishevelled practically all of the time? Do they think we're taking the gaff in a Brooks Bros. window?"

Our Boys are seeing the world—but not through rose-colored glasses. They are becoming ultra-sophisticated. And they demand that your advertising be useful "Tell All" copy which recognizes that our nation will rise or fall as it makes use of ever-advancing technology.

## Back the Attack . . . . Buy War Bonds

### A HOT SUMMER IN WASHINGTON MIGHT HAVE "MOVED" THE RHINE



### Worthington Air Conditioning Helps Meet the Menace of the Expanding Maps

In a little-known windowless building somewhere near Washington, D. C., out of which 100,000 maps a day have poured for fighting forces overseas — air conditioning prevents the fraction of a millimeter's error which atmospheric changes might cause in military maps. Such errors might "change" the course of rivers . . . spoil the accuracy of artillery fire . . . put parachutists on the wrong side of the ridge.

Humidity makes map film and printing paper stretch. Dryness shrinks them.

The two Worthington centrifugal refrigerating

machines installed in this "map factory" are part of the broad line of equipment Worthington can supply for air conditioning purposes.

Making so many of the "vitals" . . . from Diesel engines, condensers and compressors to valves and V-belts . . . Worthington is best able to engineer completely integrated systems for best results.

Write for facts on Worthington's fifty years in air conditioning, data on historic installations, and catalog material. Worthington Pump and Machinery Corporation, Harrison, N. J.

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REFRIGERANT VALVE  
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- ➞ Absolutely Tight Shut-Off, As-  
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**KNOWN AND APPROVED** throughout the air condition-  
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 **DEPENDABLE REFRIGERANT  
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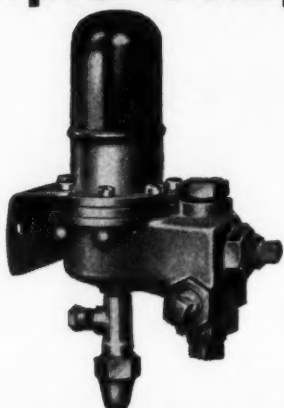
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## SNAP ACTION VALVES for Multiple Temperature

Adjustable  
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vacuum to 63  
lbs. pressure

Proven in  
Performance



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7 lbs. minimum  
to 29 lbs. max.

Free from  
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Here is a marvelous precision valve designed for systems with more than one coil, operated from the same compressor. Any variety of units such as ice cream cabinets, soda fountains, back bars, water coolers, candy counters, beer coils, storage rooms, etc., may be connected to a single compressor unit by the use of an Aminco Snap Action Valve.

This means more today than ever before, what with the difficulties experienced by the serviceman in satisfying his trade with "too little" material for the work to be done.

Aminco Snap Action Valves are not an experiment. They have proven their worth in years of actual service and are doubly useful under today's conditions when one piece of equipment must do the work of several.

May be used with any refrigerant except ammonia. For flooded as well as dry gas types or any combination of either.

As always, our company is definitely interested in the survival of the refrigeration industry and is doing its utmost to cooperate with established operators.

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## Army Refrigeration Problems

By P. B. Reed

Manager, Refrigeration and Air Conditioning Division, Perfex Corp.

### Compressor Shaft Seals (Part 6)

#### RELAPPING A SEAL

Seal leaks due to scratches or other roughness on the seal ring and/or seal nose can often be repaired by removing the seal ring and nose and relapping them, using the methods described in the Dec. 20, 1943 issue. In relapping a seal, these points are to be borne in mind:

1. Use the utmost cleanliness; clean blocks, clean naphtha, clean cloths, and clean hands.
2. Be extremely careful and do not try to rush the job. Take slow cuts with fine abrasives and finish with extra-fine that will give little more than a polish.
3. Use separate blocks for lapping steel and for lapping bronze.
4. If the steel ring is cut deep enough to go through the case-hardening, discard it instead of trying to relap and save it. The soft material under the hard skin will soon cut and wear.
5. Lapping is an art and is acquired through much practice. Do not expect perfect success on your first

attempts; try again and keep practicing to get the "knack" of it.

As the bronze nose runs on the steel shaft or ring, the two tend to form concentric ridges and grooves, especially if there is a little dirt present that embeds in the relatively soft bronze but cuts the hard steel. It is noticeable that it is usually the hard steel that is cut instead of the relatively soft bronze.

Sometimes the sealing surfaces are rather badly cut but have not been leaking. Never put a seal back together that has been running for sometime. Even though the sealing faces look smooth to the naked eye, a strong glass will show tiny circles and it is next to impossible to get the two faces back exactly as before they were taken apart; and although they did not leak before, they will almost invariably leak if put back together. Lap each face lightly before reassembling.

For the same reason and also as a precaution against damage, never pry a seal nose off its seat.

When reassembling a seal, always moisten the sealing faces with clean, compressor oil so as to provide lubrication until oil gets to them.

New replacement seals are usually coated with a heavy grease to protect them from rust or corrosion. This should be washed off in clean gasoline or naphtha.

Do not use carbon-tetrachloride as it soaks into neoprene and causes small blisters that hold the neoprene off the metal surface and allows the seal to leak. However, the neoprene gasket should be washed, but use clean naphtha or gasoline. Have your hands clean when handling a seal and use clean, lint-free cloths.

#### SQUEAKING SEALS

Seal squeaks have been a source of service calls and annoyance to the user if nothing more serious. They are frequently caused by insufficient lubrication due to the seal nose being cocked slightly (due to uneven spring pressure) which throws a strong pressure on one small edge of the nose and, since this greatly increases the unit pressure on the small

area of the nose, hardly enough gets in to prevent squeaking.

Sometimes it can be corrected by shifting the spring around 1/4 turn in relation to the bellows. This shifts the point on which the uneven pressure is exerted and lessens the unit pressure on the small edgewise surface.

Narrow seal noses are desirable for they keep themselves clean better than wide noses. If a bit of dirt does get in, it is sometimes worked off a narrow seat whereas it will stay on a wider seat and start cutting.

Moreover a narrow nose gives stronger unit pressure (pounds per square inch) of the nose on the shaft shoulder or seal ring. Too great unit pressure causes rapid wear and seal squeaks.

Seals and belts have been two of the most frequent causes of service calls, and if these two parts could be successfully eliminated a large percentage of the trouble originating from the condensing unit would automatically be eliminated.

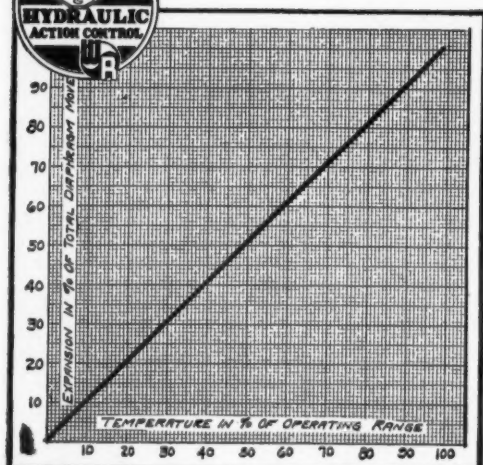
This has been very successfully done in the household refrigerator, and other self-contained fixtures that are fully factory-assembled, by building the compressor and motor into a common case and directly driving the compressor at full motor speed of from 875 for an 8 pole motor, to 3,450 for a 2 pole motor (60 cycle).

The motor-compressor is fully sealed which, in addition to eliminating the seal and belts, tends to reduce size which is an increasingly important item if the condensing unit is to be housed in the fixture itself; and also to reduce cost which is always important. It is through improvements in design and dependability and reductions in cost that the great volumes of production and sales have been achieved.

The trend is toward the self-contained fixture, all assembled, adjusted, and tested in the factory and the "sealed unit" is admirably suited to the self-contained fixture so it seems likely that the sealed unit will increase in popularity over the "open type" having a separate compressor and motor with the conventional belt drive and connections.

## DIAPHRAGM MOTION UNIFORM

### ★ PER DEGREE OF TEMPERATURE CHANGE



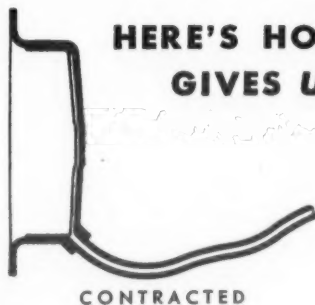
Notice, in the diagram at the left, how the expansion of the Hydraulic-Action diaphragm actually draws a straight line across the chart. This is because the force exerted by expansion or contraction under heat or cold is always *uniform*, and always predictable. That's another reason why White-Rodgers controls are easier to install and free of trouble.

#### 8 EXCLUSIVE FEATURES OF WHITE-RODGERS HYDRAULIC-ACTION TEMPERATURE CONTROLS

1. May be mounted at any angle or position, above, below or on level with control point.
2. Hydraulic-Action principle incorporating solid-liquid-filled bulb and capillary provides expansion force comparable to that of a metal bar.
- ★ 3. Diaphragm motion uniform per degree of temperature change.
4. Power of solid-liquid charge permits unusually sturdy switch construction resulting in positive contact closure.
5. Heavier, longer-wearing parts are possible because of unlimited power.
6. Dials are evenly and accurately calibrated over their entire range because of straight-line expansion.
7. Controls with remote bulb and capillary are not sensitive to change in room temperature. Accuracy of control is not affected by temperature changes in surrounding area.
8. Not affected by atmospheric pressure. Works accurately at sea level or in the stratosphere without compensation or adjustment.

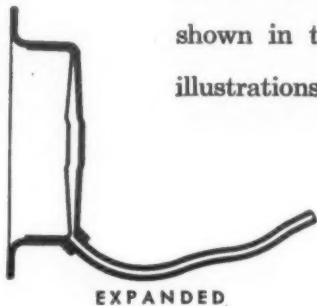


#### HERE'S HOW HYDRAULIC-ACTION GIVES UNIFORM EXPANSION



Above is a cross section of the diaphragm and part of the liquid-filled capillary. In this view the liquid has contracted, releasing the pressure on the diaphragm and causing the switch contacts to function.

In this cross-sectional view, the liquid charge of the capillary has expanded with a rise in temperature. The positive force of this hydraulic action forces the diaphragm outward and causes the switch contacts to function.



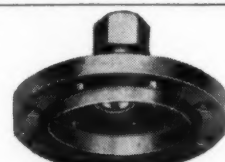
The solid-liquid charge of Hydraulic-Action provides uniform expansion and uniform motion of the diaphragm, as shown in the accompanying illustrations.

Actual-size illustration of the White-Rodgers diaphragm body, the actuating element of every White-Rodgers temperature control. It is so designed as to exert full pressure at the point of contact with the switch mechanism.



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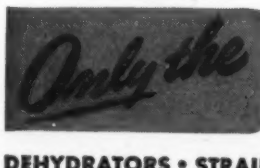
—AND WHEN YOU DO  
IT'S FASTER, LESS EXPENSIVE

Freeze-ups, clogging and corrosion have three strikes against them when your installations are equipped with the DFN System. You get unmatched triple protection against moisture, sediment, and acid—reducing a major cause of shutdowns!

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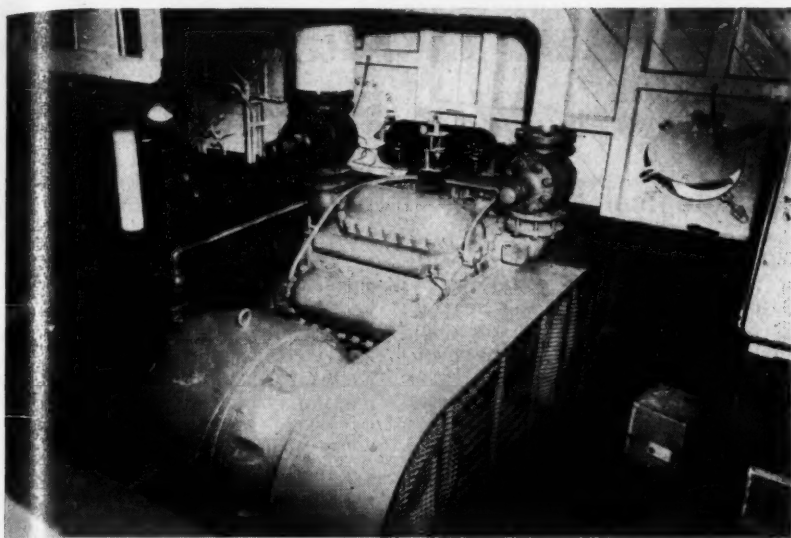


DEHYDRATORS • STRAINERS

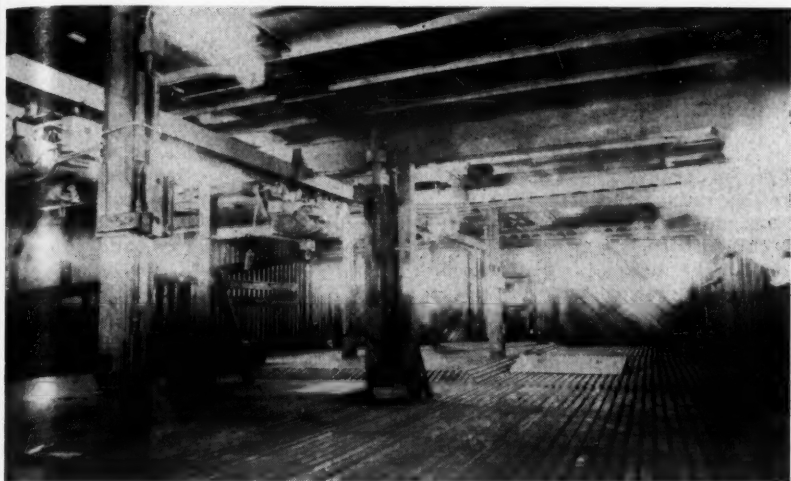
FILTERS • NEUTRALIZERS



## Equipment For Sea-Going Food Storage



This is the heart of the refrigerating system on the "BRLs"—a York 53-ton 6 1/2 x 5 inch eight-cylinder compressor driven by a 125-hp. General Electric marine motor.



Main deck refrigerated compartment showing monorail system and hoists for cargo handling. Sloping enclosure along the left-hand bulkhead is the main air supply duct with outlets under the floor gratings.

## Refrigerated Barges Back Up Fighters

(Concluded from Page 1)

pick up the cargo and deliver it to the troops. Built at National City, Calif., the barges cost \$1,120,000 each. A big feature of the equipment is a special unit which turns out 10 gallons of

ice cream every seven minutes, and a plant which manufactures 5 tons of ice a day.

The equivalent of 64 carloads of frozen meats can be stored in the barges' eight main holds at 12° F. Two main deck compartments each have a capacity of about 500 tons of fresh vegetables, cheese, eggs, and other perishable produce.

The main refrigeration effect is furnished by York Corp.'s 53 ton refrigeration unit powered by 125-hp.

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### HOW SOON CAN YOU GET THE BEST REFRIGERATION UNITS FOR YOUR PRODUCTS?

HOW SOON? is the great big \$64 question to stump the experts. And it is true that an exact answer would make a lot of people very happy. Fully aware of many wartime contingencies and uncertainties, we nevertheless feel obligated to keep you informed as much as possible concerning deliveries. Here is information that may be of help to you:

**CONVENTIONAL UNITS** are in production for high rated orders. The limiting factors are electric motors and castings. In spite of the fact that we have many thousands of motors and tons of castings placed in advance of orders, the increasing volume of business and unprecedented demands of the war on the facilities of the motor manufacturers and foundries have created an acute shortage. We advise manufacturers to place second and third quarter requirements at once and others to anticipate at least six months.

**COMPRESSORS** are in increasing demand due particularly to the growing replacement market which has resulted from restrictions or "freezing" of many types of equipment for the past three years. There are some critical materials in compressor manufacture and some manpower problems.

We suggest that you anticipate requirements at least three to six months, depending on the rating.

**REFRIGERANTS**—Production discontinued for the duration. Samples for postwar products are available to legitimate manufacturers.

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## What's Wrong With Ventilating Systems In Detroit War Plants?

**Editor's Note:** Records of investigations made by the Detroit Department of Health into more than 2,500 industrial plants in the Detroit area reveal many faults in ventilating systems, according to W. N. Witheridge, who directs the department's bureau of industrial hygiene. The following, a partial list of more than 50 faults observed, was included in a paper presented by Mr. Witheridge before the recent annual meeting of the American Society of Heating & Ventilating Engineers in Boston.

1. Inadequate air supply for an exhaust system creating an air-bound room. This is chiefly a winter problem in the Detroit climate and often occurs when a system is installed in summer with plenty of open windows and doors, and no check is made of its performance under simulated winter conditions before the installation is accepted.
2. Short-circuiting of the ventilating fan or hood by the effect of an open window, door, skylight, or stack near it, a condition which might be called "ventilating the outdoors." The frequency with which this fault occurs is amazing.
3. Locating ventilated equipment in the vicinity of open windows, permitting entrance of powerful drafts of air which impose an almost impossible task upon the ventilation. This is very common with solvent type degreasers and other open top ventilated tanks.
4. Exhaust hood located too far from source of air contaminant. It seems very difficult for plant operators and workers to appreciate the rapid deterioration of air

velocity with distance from an exhaust opening. The fact that air moves from all directions toward an exhaust opening seems to be "one of the wonders of the world."

5. Use of general ventilation with resultant waste of heat, when a local exhaust system handling a small amount of air would be practicable.

6. Backward operation of a centrifugal fan. Many persons in industry are not aware of the fact that a centrifugal fan, as opposed to an axial flow fan, will move air in only one direction (from the center outward) whether it runs forward or backward. Its capacity in reverse is, of course, greatly reduced.

7. Excessively high duct velocities when transport of particular matter is of no concern. Conversely, insufficient transport velocities in ducts carrying dust. The accumulation of flammable dust is especially dangerous.

8. Sheet metal construction that ignores present knowledge of low resistance design.

9. Substantial underestimation of the pressure losses of an exhaust system. This occurs often with flexible-type ducts.

10. Construction of ducts and hoods that are practically impossible to clean, and failure to use convenient cleanouts when provided.

11. Failure to protect all parts of the ventilating system against rapid destruction by corrosive atmospheres.

12. Selection of fans by "free-flow" ratings. Even axial flow fans as used in industry for general ventilation very seldom operate under free-flow conditions.

13. Excessive leakage of dusts or gases from positive pressure ducts that could readily be operated under suction to reverse the direction of leakage. Industrial equipment is bound to develop leaks continually.

14. Failure to provide enclosures, baffles, or windbreakers whenever possible to reduce the quantity of air to be moved.

15. Overloading an existing system by adding exhaust openings not contemplated in design.

16. Design of a system to create a specified static pressure instead of the minimum successful rate of airflow.

17. Complicated designs of local exhaust units that are quickly scrapped.

18. Drawing dusts, fumes, or gases toward, instead of away from the worker's breathing zone.

19. Blowing unheated or untempered make-up air at workers during the winter season.

20. Recontaminating plant air by discharging contaminant outdoors at a point where it can easily return to the plant.

21. Recirculating contaminated air from an exhaust system back to the factory atmosphere without effective cleaning.

22. Use of the wrong type or size of air cleaner. This includes use of too small or too large cyclones, insufficient filtering area, wet collection of dusts that resist wetting, single stage collection on a very heavy dust load with a great range of particle sizes, and (quite unbelievable!) ozone generators still being installed for the purpose of eliminating carbon monoxide.

## How Ventilating Engineers Can Help In Maintaining Vital War Production

Psychological Problems Involved, A.S.H.V.E. Told

BOSTON—Engineers allied with the industrial hygiene field owe a long-overdue apology to the heating and ventilating profession for their failure, so many times in the past, to state in readily digestible terms what the ventilating engineer needs or desires to know about the air contaminants he is asked to control, the American Society of Heating & Ventilating Engineers was told during its fifty-first annual meeting here recently.

The speaker was W. N. Witheridge, who, as director and chief of the Detroit Department of Health's bureau of industrial hygiene, has been directly associated with problems involved in maintaining war worker's health and thus keeping up production in the many war plants in Detroit.

### DATA UNSATISFACTORY

The ventilating engineer "is asked to reduce the concentration of X dust down to Y million particles per cubic foot of air, and then told that after he makes his first attempt, someone will return with an electrostatic precipitator and anemometer to find fault with his installation," complained Mr. Witheridge.

"Rarely do we bother to advise him in advance that the required air purity is nearly equal to that found outdoors on a clear day in that vicinity—or some equally revealing information."

"Maximum allowable concentrations in air of substances that are dangerous to breathe must be translated into workable standards, particularly when industrial hygienists jealously maintain that air testing for extremely small amounts of dusts, fumes, or gases is a highly technical procedure," Mr. Witheridge declared.

"In fact, the ventilating engineer has no intention of becoming also an analytical chemist. Furthermore, he cannot go into his fan table with a maximum allowable concentration figure and come out with anything but a headache. This we have learned forcibly from engineers who have no time nor desire to juggle chemical equations," he admitted.

"The best way to get prompt, sure-footed results is to specify a ventilation rate for a given hazard exposure, or industrial process that has a good chance of keeping the air contamination below the accepted maximum allowable concentration," suggested Mr. Witheridge.

"If this rate proves to be excessive or inadequate after repeated tests over a wide variety of operating conditions, in numerous plants under different supervisory and labor conditions, and by independent investigators, a new standard obviously is required."

Laymen, including both employers and employees, have little alternative to judge health hazards except by what they see, sense, or experience for themselves, pointed out Mr. Witheridge.

"This is a distinct handicap in the field of occupational health hazards and especially troublesome when dealing with microscopic and sub-microscopic matter such as dusts, fumes, mists, vapors, and gases."

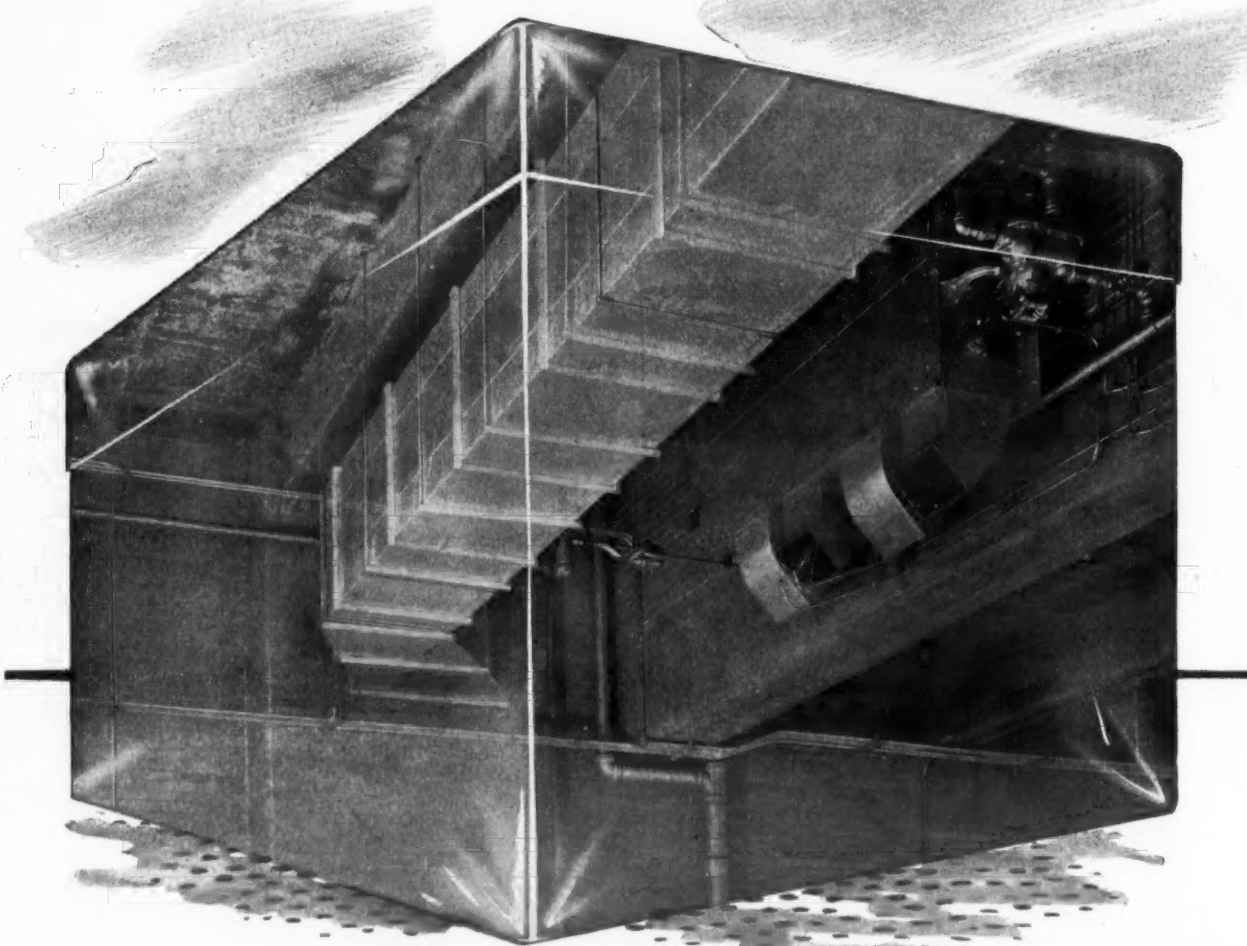
### CAN'T DETECT SOME GASES

"Why? Because many of the dangerous air contaminants make absolutely no impression on our physical senses until the damage has been done," he declared. "Workers can 'carry on' for months and years under hazardous concentrations of silica dust without any discomfort or evidence of harm and finally they seem to have suddenly developed a case of disabling silicosis."

"They may, for instance, resent very bitterly a suggestion that they be transferred from an interesting good paying job that creates invisible but dangerous concentrations of lead fumes, because they have not yet become ill with lead poisoning," he went on.

"Or they may actually like the odor of the vapors of a new organic solvent which does a much better production job, and be quite unaware of the possible effects on their health of inhaling these vapors in small quantities over a long period of time. . . ."

(Concluded on Page 21, Column 1)



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Air Conditioning & Refrigeration News



## Workers Sometimes Object to Turning on Ventilating Systems, Says Health Expert

(Concluded from Page 20, Column 5)

"It is also a point of importance to the industrial ventilating engineer to know that the customers and users of his equipment are not always sold on the idea of having it around," stated Mr. Witheridge.

"Perhaps he was called in to design or install a ventilating system because a government inspector so ordered. Perhaps top management is fully aware of the dangers of a certain operation, and both the men and their supervisors find ventilating equipment already installed as soon as they arrive on their new jobs.

"But perhaps these men find that the type of mechanical ventilating equipment devised slows up their production rates and they notice no serious discomfort or ill feeling when they fail to turn on the fan. Someone in the plant may eagerly promote the idea that the ventilating engineer dreamed up a useless system with a white elephant future. The next job of ventilation in that plant goes to another designer.

### ENGINEER HANDICAPPED

"Why is the foregoing situation worthy of comment? Because the ventilating engineer who designs a system for the control of a certain dust, fume, mist, vapor, or gas must know whether that substance is visible, irritating, offensive, or whether it has no effect whatever upon the human senses at the concentrations present in the plant air," Mr. Witheridge explained.

"If his system produces an obvious and highly welcome improvement in the factory atmosphere, the users will put up with some mechanical interference on their jobs in exchange for their health or comfort. "If, however, his equipment has the essentially thankless job of keeping an odorless gas or an invisible fume under control, he must take extra pains to design it with as little interference with normal plant operations as is practically possible to achieve.

"Observed many times in the Detroit area has been the scrapping of expensive process ventilating equipment that failed to take serious account of 'the silent sabotage of a very low Use Factor.' It might be a mechanically ingenious design, built to endure, pleasing in appearance, but such a confounded nuisance to operate in a mass production plant that its 'use factor' is strictly zero."

Specific examples (see box) of many of the problems confronting ventilating engineers and some of the objectionable faults found in actual ventilation systems were cited by Mr. Witheridge from records of investigations of more than 2,500 industrial plants in Detroit.

### MAY LOSE ORDER

"One of the 'bread-and-butter' problems confronting the conscientious and competent ventilating engineer is the loss of an order to a concern that specifies equipment which he knows has little chance of complying fully with health or labor department requirements," Mr. Witheridge declared.

"Perhaps it is known that enforcement of industrial health standards is inadequate or very tardy in a certain city or state and therefore the industrial customer takes a chance on a less costly or makeshift installation which he hopes will pass government inspection. . . .

"Ventilating engineers who encounter this situation throughout the country are anxious to see better enforcement of minimum standards—those which they personally know to be quite necessary if honest value is to be given for the customer's ventilation dollar.

"I and my associates have observed an almost monotonous tendency on the part of many plant operators to approach an air handling problem as if it were quite as elementary as the opening of a bedroom window," he continued.

"They are an easy prey to the ill-advised person who promotes his product as the universal solution for all problems of factory ventilation. They are the customers who are easily misled and then become disgusted when mention is made of 'ventilation' or 'ventilating engineers.'"

### RESPECT EXPLOSION HAZARDS

According to Mr. Witheridge, there has always seemed to be greater respect for the explosion hazards carried by industrial atmosphere than for the hazards to the health of workers breathing the same air.

"In the usual manner, knowledge of such possibilities for accident is obtained by suffering many tragic and costly industrial explosions that are immediately and drastically impressive. At present, it is much easier to get an industrial executive to eliminate the explosion hazard in the handling of a volatile liquid than it is to make him concerned about the slow and quiet development of an occupational disease to which the workers might be exposed," he pointed out.

"In fact, if the explosion hazard is controlled, he is quite anxious to consider the health hazard equally under control.

"Unfortunately, it so happens that the concentrations of flammable vapors that are kept to  $\frac{1}{4}$  or  $\frac{1}{2}$  of the lower explosive limit to provide a reasonable safety factor, are still not so low as they must be if the vapor-laden atmosphere is breathed by human beings. . . .

"The current necessity for fuel conservation has brought into sharp relief the demands for permission to recirculate to the general factory atmosphere the air used to remove excessive process dusts or other contaminants," stated Mr. Witheridge.

"Some of the most important recent advances in industrial ventilation technique have occurred in this direction. Such installations impose the most severe demands upon industrial air cleaners of all types when the air they discharge must be clean enough to breathe all day without harm to health.

### AIR CLEANER PROBLEMS

"Many air contaminants of a highly dangerous nature create atmospheres that defy the best commercially practical air cleaners yet devised, and consequently, must be discharged outdoors through high stacks along with valuable heat units. . . .

"In general, the hazardous gases, vapors, and fumes are most difficult to remove while the dusts and mists offer the best opportunities for recirculating systems," he declared.

Of the discussions by A.S.H.V.E. members that followed presentation of Mr. Witheridge's paper, that given by Lester T. Avery was perhaps the most dramatic.

### FOUNDRY CONDITIONS

Stressing the importance of industrial ventilation, Mr. Avery displayed photographs taken in various departments of foundries, which are considered of extreme importance to the production of war materials and which, from time to time, have been faced with severe manpower shortages, according to War Manpower Commission reports.

Severe dust contamination in these particular foundries was obvious in Mr. Avery's pictures, chiefly because it was almost impossible to take good pictures, so thick was the dust, Mr. Avery declared and showed.

This was especially noticeable in the "knock-out" rooms, where castings are knocked out of the sand molds, he said.

Attempts at improving air conditions were rather crude and ineffectual, according to Mr. Avery. In some instances propeller type fans

had been so placed to blow dust and fumes away from one group of workers directly into areas where other workers were employed.

It is difficult, too, to sell a foundry operator on the installation of adequate ventilation and heat control, not to mention summer comfort

coding, it was pointed out. Because foundries are naturally heated from the furnaces, it is considered unnecessary in some instances to provide properly controlled heating. This results occasionally in some portions of the building being too cold for health and comfort.

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★ Many refrigeration suppliers and dealers are experiencing difficulty in furnishing satisfactory repairs for refrigeration compressors now in service. This is due to limitation orders on new equipment, a serious shortage of manpower, and other conditions beyond their control.

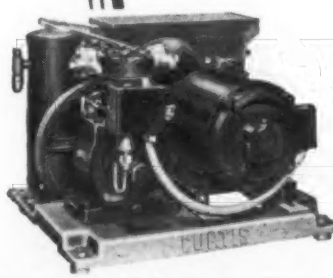
To keep essential Curtis refrigeration on the job while new equipment is restricted for the duration, Curtis reminds you **FACTORY REBUILT REFRIGERATION COMPRESSORS** are available on an **EXCHANGE** basis. These compressors are sold in exchange for Curtis compressors needing repairs and are fully guaranteed.

By utilizing this Curtis exchange plan, you can secure a factory-rebuilt and guaranteed Curtis compressor, which will give you long, dependable, and efficient service.

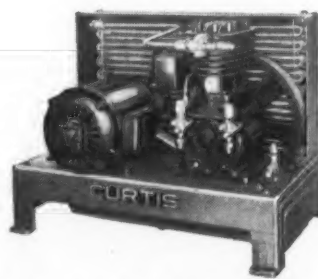
This is but another example of how, despite shortages and limitations, Curtis is making every effort to be of the greatest possible service to dealers and users of Curtis equipment.

Today, Curtis' war job is building more and more Curtis products for our Armed Forces and Essential Industries. This wartime experience, added to that accumulated by Curtis in the past 90 years, assures even finer Curtis equipment for civilian uses after Victory is won.

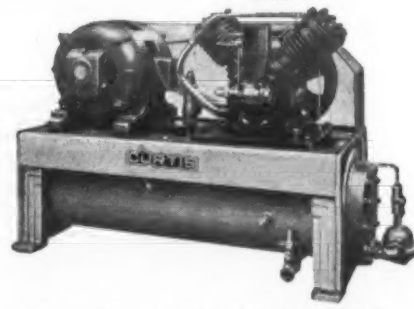
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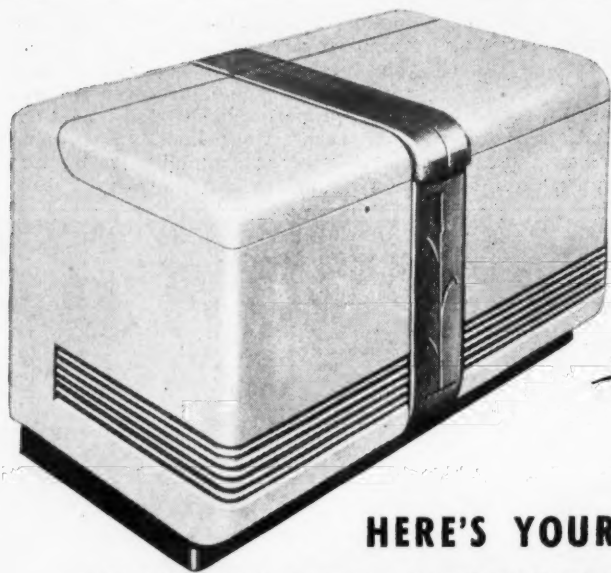
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## Inventory Rules on Aluminum Strip Are Tightened

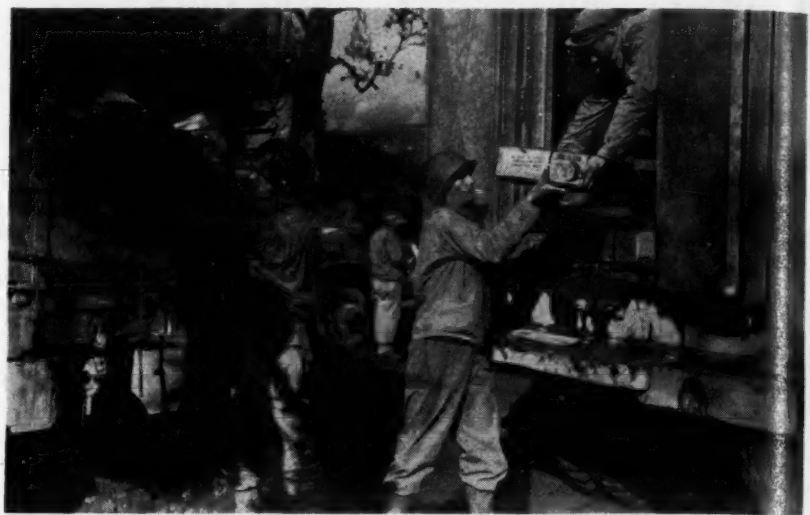
WASHINGTON, D. C.—Inventory restrictions applicable to users of aluminum sheet, strip, and plate have been tightened because of heavy demands for these forms of the metal in aircraft production, WPB announced Feb. 1.

Under the new rule, a user of 10,000 lbs. or more a month is not permitted to accept delivery of any item of aluminum sheet, strip, or plate if his inventory is, or would become because of such acceptance, in excess of the quantity of such item he requires during the succeeding 30 days for authorized production. Users previously were limited to a 60-day supply.

This rule, which is contained in Direction No. 21 to Controlled Materials Plan Regulation No. 2, does not apply (1) to any aluminum sheet, strip, or plate in transit or loaded for delivery on Feb. 5, 1945, or (2) to aluminum sheet, strip, or plate that is shipped by a producer (but not a warehouse) prior to March 1, 1945. The second exception to the general rule has been included to permit mills to continue operation on schedules that have, in most cases, already been planned for February, 1945.

Users are required to cancel or modify their outstanding orders for aluminum sheet, strip, and plate in order that they shall conform to the requirements of the new Direction No. 21.

## How Army In Italy Gets Fresh Food



These pictures show how Fifth Army Quartermaster forces keep American front-line soldiers in Italy supplied with fresh foods. In many instances, as shown above, supplies are issued direct from refrigerated van (the Army version of "reefers") to unit trucks.



Here is the complete field installation operated by the 280th QM Refrigeration Company at San Casciano. Equipment consisted of three 1-ton portable ice-making machines (under canvas) and two sectional cold storage warehouses.

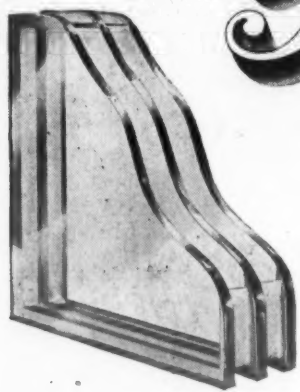


Pfc. Harry H. Madoniels and Sgt. Joseph Friery of the 280th harvest ice from the portable ice making plants, which produce a ton of ice per day.

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# Refrigeration Anesthesia an Answer For Surgery Cases Thought Hopeless

## Elderly Patients Recover Rapidly

DAYTON, Ohio — How elderly patients are able to "sit up and take nourishment" and in one instance even smoke a cigar soon after a major amputation done with refrigeration anesthesia is related by Dr. R. T. Fox, resident physician in surgery at Miami Valley Hospital here. Dr. Fox collaborated with Dr. William S. Clark, former director of the Department of Physical Medicine, at the hospital in working out the technical details related to the use of reduced temperatures as an anesthetic.

Currently Dr. Fox is completing a report on the case histories of 12 patients, ranging in age from 65 to 79, all too old to be even fair operative risks under ordinary conditions. Most of the patients reached the hospital in a serious condition, marked by the presence of advanced gangrene, necessitating a major amputation. Several patients had the high fever attendant to this condition and were delirious upon arrival at the hospital.

According to Dr. Fox these patients might be divided into three distinct classes as follows:

1. Patient refused surgery.
2. Surgeon refused to operate.
3. Operative group.

In the face of these almost "hopeless conditions" the mortality rate on the 12 cases reviewed by Dr. Fox was 25% when refrigeration was employed as the anesthetic. This compares with a mortality of 50% on some 40 amputation cases in a similar age group and condition handled in the same hospital, without the benefit of refrigeration anesthesia.

Dr. Fox attributes this marked improvement in mortality rates to two factors. First, the control of infection by the application of refrigeration prior to the operation and secondly the reduction of shock when refrigeration is used for anesthesia.

When infection has advanced to the point where the patient becomes a poor operative risk, Dr. Fox applies ice to the infected limb for a period that may range from a few hours to several days. This treatment often results in a measure of control of the infection, and the patient's temperature is reduced to a point where he becomes a better operative risk.

In one instance Dr. Fox and Dr. Clark tried gradual removal of the patient's limb from the ice, but the patient's temperature rose swiftly and the ice application had to be restored to bring the patient's temperature back to normal by reducing the infectious process.

After the patient is in an improved operative condition refrigeration is applied for a period of three to five hours, thus inducing complete anesthesia in the infected limb. When the amputation is in progress, novocaine is applied locally to exposed nerves and blood vessels, eliminating the possibility of pain. Injections of sodium pentathol are used to induce sleep while the operation is in progress. With this procedure the tourniquets which were formerly used in connection with re-

frigeration anesthesia were found to be no longer necessary.

Originally Drs. Fox and Clark used a wooden keg of cracked ice as the refrigeration media. The limb was placed in the keg and then carefully packed in ice. At the present time cracked ice is held in position around the limb by means of a rubber sheet. This is so arranged that the water from the melting ice is drained into a container beside the bed.

From his experience to date, Dr. Fox does not believe that refrigeration anesthesia is the complete answer to the problems of the surgeon in operating on old people and diabetics. The results, however, have been encouraging to the point where he would like to see the technique continued and improved.

Dr. Fox likes to tell how several of

his patients have been able to eat a regular meal soon after an amputation, indicating an almost complete lack of the usual shock. In one instance the patient was not only able to eat soon after the operation, but asked for a cigar and apparently enjoyed smoking it.

Pointing out that very little is known about the physiology of cold, Dr. Fox hopes that research work will be done which will give the medical profession much needed basic material about the affects of cold on living tissue. The affects of reduced temperature on circulation, the actual condition of cells, and the effect upon the exchange of gases between tissues at lower temperatures are still a matter of conjecture.

"At the present time we know that the results of refrigeration anesthesia are favorable in certain types of cases," Dr. Fox states, "but we are not aware of the physiology


which makes these results possible. More research work on this subject should disclose many interesting facts."

Dr. Fox believes that the use of refrigeration anesthesia by the medical profession is well ahead of the development of specialized medical equipment by the refrigeration industry for this purpose.

"While we understand that mechanical refrigeration equipment for our purpose is now available from at least one source (Therm-O-Rite Products Co., Buffalo, N. Y.) we are still using the crudest type of refrigeration applications on our patients. The result is an extremely high

nursing cost, as ice packs must be changed constantly both before and after the operation.

"We hope that the refrigeration industry will develop the type of equipment that will be needed by surgeons and physical therapists all over the country, both for refrigeration anesthesia, and for the treatment of many pathological conditions. Naturally, many problems of temperature control are involved, but we believe that the refrigeration industry has the skill and the equipment available to meet this situation, once the best minds of the refrigeration industry set to work on the problem," Dr. Fox said.



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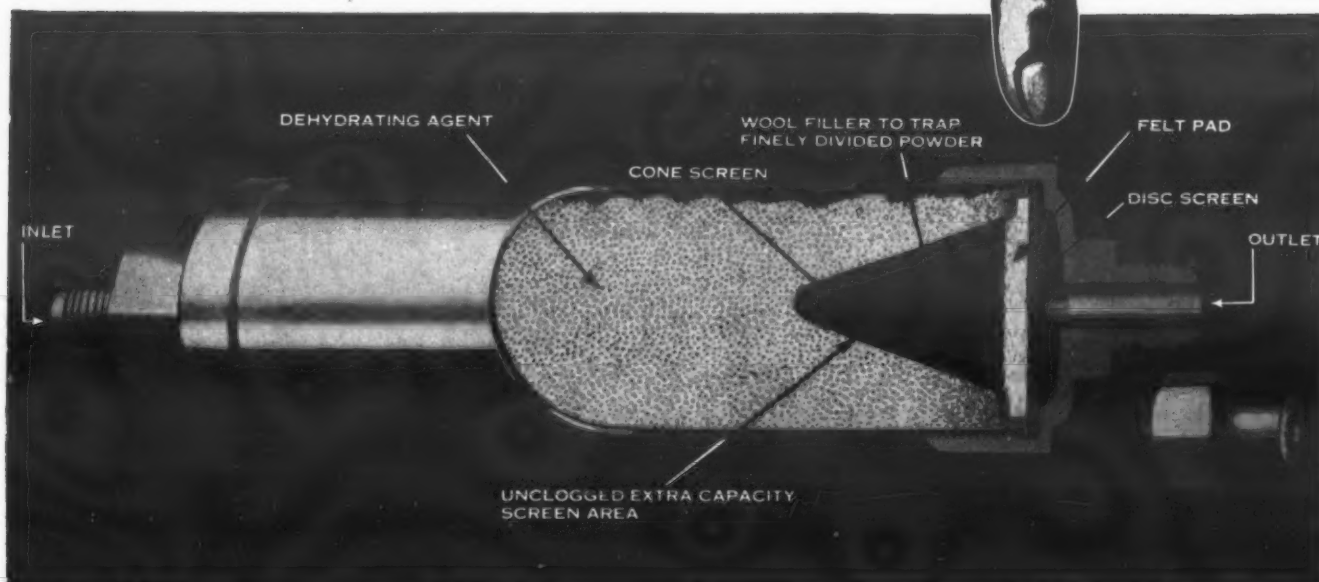
Mueller Brass Co. Filters and Driers feature the CONE SCREEN OUTLET, a specially designed filtering element that adds immeasurably to the life and efficiency of driers and filters.

Almost all crystalline dehydrating agents are subject to a certain amount of abrasion while a dehydrator is in service. Small portions of the dehydrating agent break down into very fine powder and crystals. Unless a well-designed filtering element is incorporated in a dehydrator, these fine crystals and powder have a tendency to clog the outlet filter, resulting in restriction to the flow of refrigerant.

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### Frigidaire Series Is Resumed

**Editor's Note:** The material published on this page is a resumption of the series on servicing of Frigidaire equipment. The last previous instalment was published in the Jan. 1 issue.

Publication of the series had been interrupted to permit a final check of the information by Frigidaire factory officials. This final check produced a number of revisions which should increase the value of the material to the readers.

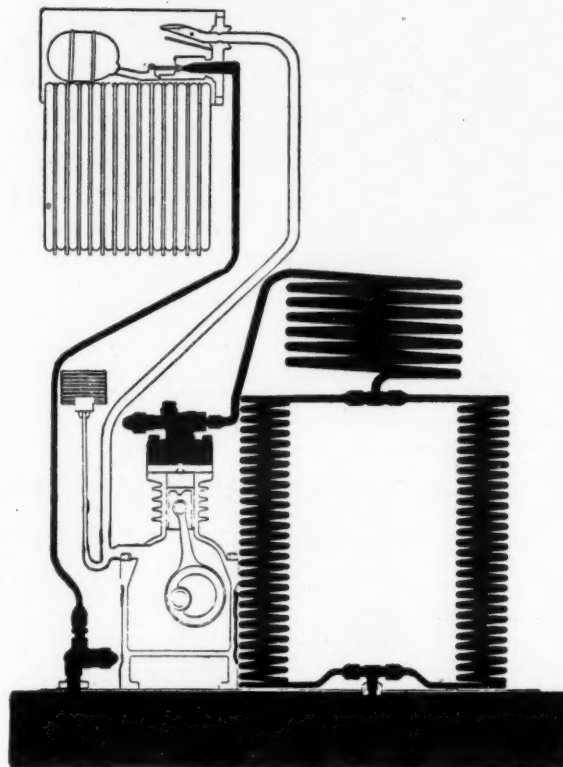
The material in this series of articles was prepared through the cooperation of the Frigidaire Division of General Motors Corp. service department. It is thus authentic information on service procedures for Frigidaire refrigerators employing the open-type reciprocating unit.

While the information in this series treats specifically of the household refrigerators, it is worthwhile to know that the same type of systems was used in ice cream cabinets, water coolers, beverage coolers, and other commercial refrigeration equipment, and the information can be applied in servicing such equipment.

## Servicing Frigidaire Open-Type Systems

### Instalment No. 3

#### 10—Adding Refrigerant



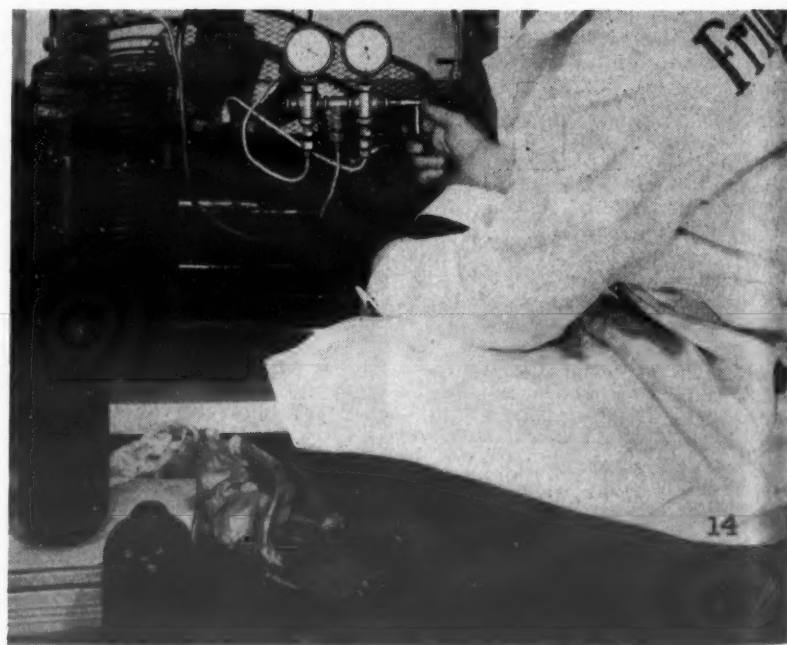
A shortage of refrigerant can cause—

Continuous operation  
Hissing at freezer  
Cabinet too cold  
Cabinet too warm

In order to assure proper operation, it is absolutely necessary to maintain the correct amount of refrigerant in the system at all times. A glance at Illustration No. 10 will visualize how insufficient refrigerant can cause such symptoms as continuous operation and hissing at the freezer, with resultant cabinet temperatures being too warm or too cold.

And when there's not enough refrigerant, there's only one thing to do, and that's to add more. This operation is comparatively simple if the service man follows the steps carefully.

#### 11—Adding Refrigerant Through Low Side of System



First, install the gauge set and run a charging line from the servicing connection to the drum. The latter is placed on an ordinary bathroom scale and weighed to determine how much refrigerant will be used. The connection at the servicing outlet, incidentally, should be loosely made, and both gauge valves closed. Then the valve on the drum should be cracked for an instant or two which will purge the charging line of air. Then tighten the connection at the servicing outlet and again open the drum valve.

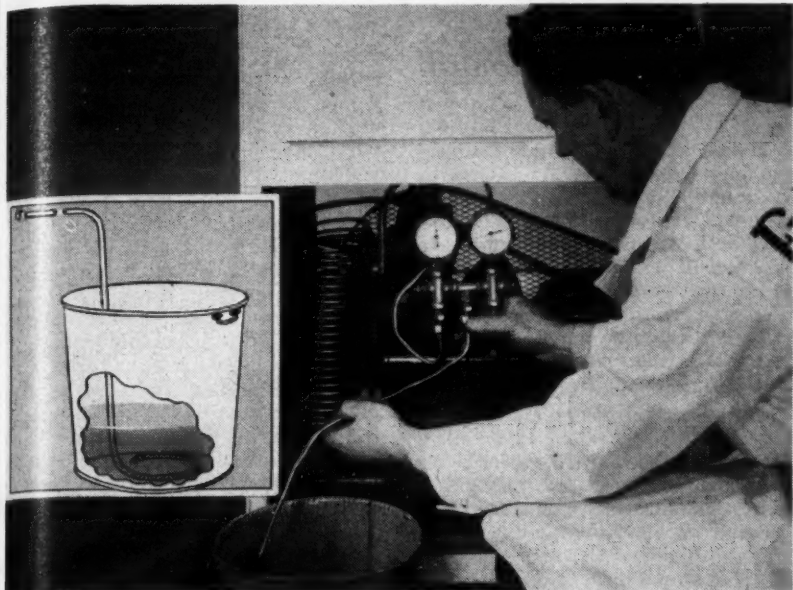
Since the actual charging operation is now ready to be undertaken, open gauge suction valve so refrigerant can enter system. When a sufficient charge has been added, which is determined by trial, the drum valve and the gauge suction valve can be closed, the charging line removed from the servicing connection, and the gauge set itself removed.

Finally, weigh the drum to see how much refrigerant was used, and by all means cap the charging line and the drum valve to prevent the entrance of moisture or foreign particles. That completes this method of adding refrigerant. But what about removing it? For just in case too much has been added or air has been drawn in, there is no choice but to remove it.



## Servicing Frigidaire Systems

### 12—Purging the System (Unit Idle)



First, attach purging line to gauge connection and place perforated end of line in bottom of container, as shown in the insert. Then pour into the container the neutralizing agent which is made up of 3 lbs. of bicarbonate of soda to a gallon of water. Notice that the end of the purging line has been perforated with small holes and that it is horizontally looped so as to lie flat in the bucket. This method permits the uniform and gradual release of refrigerant into the soda solution without danger of excessive bubbling or splashing.

Now open the discharge gauge valve and permit the  $\text{SO}_2$  or air to escape from the condenser. The opening of this valve should be done carefully so as to release refrigerant or air slowly into the neutralizing agent. To determine when purging is complete, close the gauge discharge valve, allow unit to stand idle, and compare head pressure with room temperature and temperature-pressure charts. This checking need be done only occasionally, when it is believed the purging is complete.

When purging is complete, close the valves and remove the purging line and gauges. Then dispose of the neutralizing agent by pouring carefully into a floor drain and flushing thoroughly with clean water. The preceding operation concerns  $\text{SO}_2$  only. As for "Freon," this can be purged directly into the room, provided there is no open flame and the amount is not excessive. In case it is, the refrigerant should be transferred by means of a charging line to the outside.

### 13—Adding Oil—General Suggestions



The Frigidaire oil to use depends upon the type of condensing unit and the kind of refrigerant.

Although all units are charged with the proper amount of oil when leaving the factory, oil shortages will sometimes develop, causing noisy or overheated compressor bodies. It is easy to see that a shortage of oil can cause a number of unsatisfactory conditions.

Keep in mind, however, that these symptoms may be caused by an actual oil shortage or by the uneven distribution of oil in the system, which could result from its migration to the freezer due to insufficient refrigerant. This means that service men should first make sure that the system is really short of oil before proceeding to add it.

When adding is indicated, be sure to use Frigidaire oil of the proper type. There are three viscosities—75, 150, and 300—and until sure of the one to use, don't proceed with the job. Then, when this point has been settled, determine the amount of oil needed.

Some condensing units are equipped with two oil plugs—an oil level indicating plug and a bottom drain plug. On such models, it is easy to judge the necessary amount of oil to add; but some compressors have only a bottom plug, which necessitates draining out all the oil and adding a full new charge, since there is no way to determine the oil level.

## Superior Valve Opens New Chicago Office

PITTSBURGH—Superior Valve & Fittings Co., is opening an office and warehouse at 565 West Washington Blvd., Chicago.

This office will serve Superior's customers in Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska, Colorado, Indiana, the western tip of Kentucky, and the western half of Michigan, according to K. M. Newcum, vice president in charge of sales.

Irving A. Wilson, present Superior Midwestern representative, has been appointed manager of this operation and will continue to maintain field contacts. Thomas E. Cunningham, who has been transferred from the factory, will be assistant manager and have charge of the office and warehouse.

The Chicago office and warehouse will be a stocking and shipping point for standard cataloged items.

## Johnson Factory Manager For Buffalo Forge

BUFFALO—Nathan R. Johnson has been appointed factory manager of the Buffalo Forge Co. to succeed the late Don R. Marsh. Mr. Johnson has been with the company for 28 years and recently has been general purchasing agent.

Henry D. Hebard, who has been with the company 24 years, has been made director of purchases. He has been assistant to Mr. Johnson in the purchasing department.

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surface condition not desirable because it tends to catch and retain dirt. But we don't do this.

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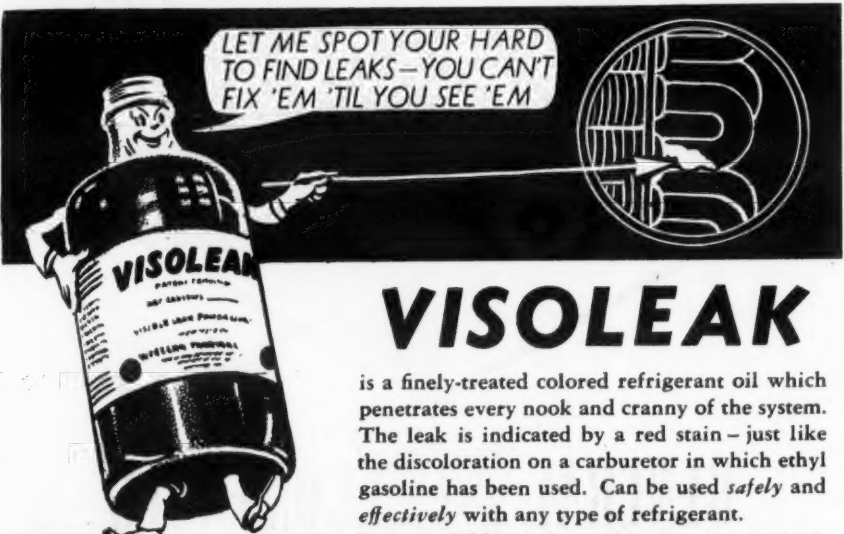
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SAVE 10% ON CASE LOTS

# How a Differential Temperature Expansion Valve Functions In Low Temperature Jobs

## Surge Device & Ethane Charge Give Close Control

NEW YORK CITY—Low temperature applications of Detroit Lubricator Co.'s new differential temperature expansion valve designed for operation below -30° F. were outlined at the recent fortieth annual meeting of the American Society of Refrigerating Engineers here by Frank Y. Carter, Detroit Lubricator engineer. One feature of this valve, as described by Mr. Carter, seemed especially interesting to the A.S.R.E. members. Incorporated in the valve is an adjustable surge control device by which the maximum needle opening can be limited and thus, in effect, permit sizing the valve capacity to the load.

Dan Wile of Carrier Corp. suggested that valve manufacturers should consider applying the anti-surge device to valves used in standard temperature ranges as well as low temperature work.

Another departure from conventional practice in this valve, listed as No. 793, is the employment of a different refrigerant in the two power elements than is used in the cooling unit, pointed out Mr. Carter. Ethane is used as the charging medium for the power elements while the system is generally charged with some other refrigerant suitable for low temperature applications.

Purpose of using ethane instead of

"Freon" is to make the valve sensitive to slight temperature changes when operating in the low temperature range, said Mr. Carter. A "Freon-12" valve that required a 3° F. bulb temperature change to open to full rated position at air conditioning temperatures, for example, would require approximately 33° F. bulb temperature change to open to the same rated position when operating at -100° F. suction temperature, he explained.

### What Determines Capacity

"The capacity of an expansion valve depends on a number of factors, among them the pressure drop across the orifice, the inlet liquid temperature, the suction temperature, and the orifice area or its equivalent, needle opening," said Mr. Carter.

"For practical purposes, if all other factors are held constant, it may be said that the capacity varies directly with the valve needle opening, this being true within the limits of movement ordinarily used.

"The needle opening and the capacity of the expansion valve are definitely related to the valve superheat setting. A plot of the needle openings versus feeler bulb temperature increases will show that the needle opens an approximately constant amount for each degree F. increase in feeler bulb temperature at constant suction pressure.

"The increase in feeler bulb superheat over and above the 'static superheat' setting is called the 'opening superheat.' Thus the capacity of a thermostatic valve is directly related to the 'opening superheat.' The sum of the 'static' and 'opening' superheats is referred to as the 'operating superheat,' because the valve will actually operate at this value of superheat."

At exceedingly low temperatures, -100° F., for example, pressure change in a valve power element charged with "Freon-12" at a 3° F. change in superheat is sufficient to open the valve only 1/15 the amount at normal air conditioning temperature, resulting in a starved evaporator, pointed out Mr. Carter.

One way around this has been to employ a 15-ton valve on a job designed to produce one ton of refrigeration at -100° F., but this means very large valve with the need working virtually on the seat.

"There is more tendency for dirt, moisture, and wax to accumulate at the seat with this type of operation and a great possibility of flood-back and bad surging during periods of higher suction temperature operation such as during pull-downs," Mr. Carter declared.

The 793 valve has two opposed power elements, the evaporator power element (its feeler bulb clamping to the valve outlet feeler line and in effect feeling the suction pressure); and the superheat power element (its feeler bulb clamping to the suction line at the evaporator outlet in the same manner as the feeler bulb on the conventional thermostatic expansion valve).

"The difference in temperature between these two bulb locations (superheat) governs the flow of refrigerant through the valve to keep the evaporator fully refrigerated during compressor operation," explained Mr. Carter.

### Power Element Charge

"Both power elements are charged with ethane, a very high pressure refrigerant . . . and at temperature as low as -100° F., the power element pressure will change almost 1 p.s.i. for each 1° F. feeler bulb temperature change. . . . This allows the use of a relatively small orifice with the needle working far off the seat, and minimizes the likelihood of moisture, dirt, or wax plugging the orifice.

"The application of a small orifice with the needle moving through a relatively large distance also results in smoother metering. The small orifice, because of its limited capacity, also eliminates surging during pull-downs."

Because this valve is not affected by the suction pressure of the refrigerating system, it can be applied universally and used on any refrigerant not injurious to brass, according to Mr. Carter.

Use of ethane in the power elements to achieve satisfactory operation.

(Concluded on Page 27, Column 1)

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EVEN if a scarcity of skilled repairmen has interfered with your ability to service fractional-horsepower motors, here's a way to get your share of this increasing wartime business.

These G-E Plans enable you to repair or replace, quickly, economically, and expertly, practically any G-E fractional-horsepower motor which has become inoperative, regardless of the type or make of appliance on which it is used. And there's no need for you to train repairmen—G.E. does the work, quickly and reasonably, and you know your profit beforehand. You render the service without actually making the repairs.

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**1. The Exchange Plan**—Covers the most commonly used types of G-E fractional-horsepower motors. Makes possible immediate replacement, from G-E field stocks or from your own buffer stock. Replacement motors carry the G-E new-motor warranty, except for finish.

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**3. Regular Repair Plan**—Covers f-hp motors not included in either of the other two plans, except extremely old or obsolete models. Inspection is made at the factory, and a cost estimate is submitted before work is started. These motors also carry the G-E new-motor warranty, except for finish. This plan rounds out this G-E service and enables you to handle repairs on practically any G-E fractional-horsepower motor.

General Electric Company, Section G700-76C  
Schenectady 5, New York

Gentlemen:

I'd like to know more about how your FACTORY SERVICE PLANS for f-hp motors can help me. Please send me a copy of your booklet.

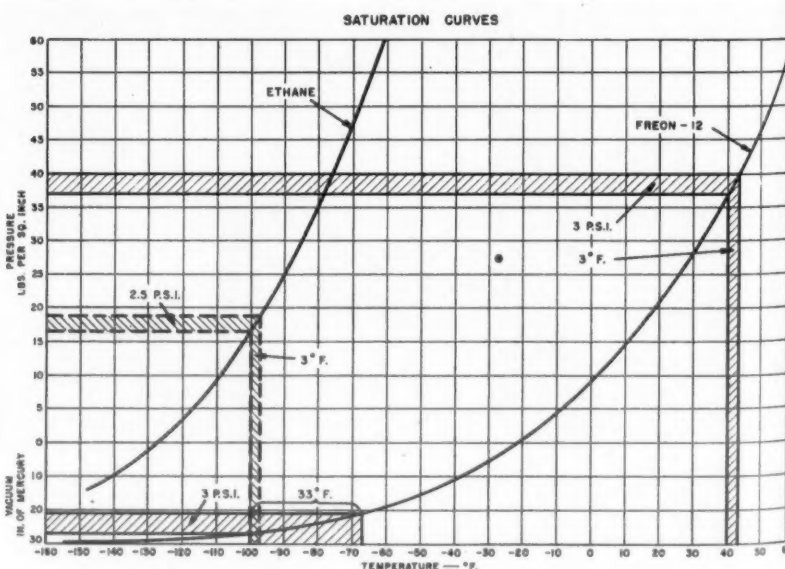
Name \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_



FRACTIONAL-HP  
MOTORS

GENERAL ELECTRIC

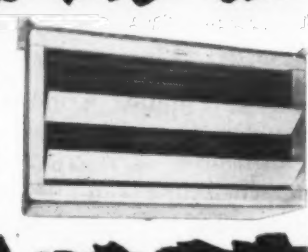
Buy all the BONDS you can—  
and keep all you buy



The above chart gives the characteristic curve of the refrigerant "Freon-12" and shows that a 3° F. change in temperature will result in a 3 pounds per square inch change in pressure at 40° F., while a 33° F. change in temperature will be required to result in the same 3 pounds per square inch change in pressure at -100° F.

### FOR BALANCED HUMIDITY!

O-KAY COILS are engineered to maintain moisture balance between air and products—to prevent dehydration. Designed and built by men who know your application problems. Write today for information.



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KAY PRODUCTS COMPANY • Division of Tyler Fixture Corp. • NILES, MICHIGAN



# Characteristics and Operation of a Differential Temperature Valve

(Concluded from Page 26, Column 5)

tion at low temperature does confine application of the valve to a range below -30° F., it was stated by Mr. Carter. Pressure developed by a full charge of ethane at room temperature would be much greater than any bellows could withstand, so the charge of ethane is limited, he explained.

The resultant maximum opening temperature of -30° F. is not an important consideration in applications where pull-down time is of little concern, averred Mr. Carter. In applications, such as stratosphere chambers, where rapid pull-down is essential, this difficulty may be overcome by hooking a standard thermostatic expansion valve in parallel with the differential temperature expansion valve, he said. The standard valve is operative down to -30° F., at which point it automatically cuts out and the No. 793 valve begins feeding refrigerant.

## Function of Superheat

"The differential temperature expansion valve opens and feeds refrigerant through the main orifice only when the superheat feeler bulb is warmer than the evaporator feeler bulb by an amount equal at least to the differential setting," continued Mr. Carter.

"If the valve is set to operate with a 10° F. difference in bulb temperatures, it will feed when the temperature difference is 10¼° F. or more. When the temperature difference between the bulbs is less than 10° F., the main valve needle remains closed. This latter condition always occurs when the equipment is being started up after a shutdown period.

"It is apparent that the valve could never start feeding unless some means were taken to create a temperature difference between the two feeler bulbs. This is accomplished by cooling the evaporator feeler bulb by means of an auxiliary expansion orifice to a temperature low enough to allow the superheat power element force to overcome the evaporator power element force and open the main valve orifice.

"Since the gas-charged power elements are limited in pressure, the evaporator feeler bulb must be cooled to a temperature of -30° F. before the main valve comes into operation. The auxiliary expansion orifice bypasses the main orifice and is built as an integral part of the valve. It

is supplied with a manually adjustable metering stem but remains open and feeds a constant amount of refrigerant once it is adjusted.

"This means that when the system is shut down, the bypass orifice will be open and will feed even though the two feeler bulbs equalize in temperature and close the main orifice. It is therefore imperative that a solenoid valve be used to close the main liquid line when the unit ceases to operate."

Action of an expansion valve when it is used over a complete range of suction temperatures, as in a stratosphere chamber, was then outlined by Mr. Carter.

"At the high end of the range the compressor capacity is very large, the evaporator T.D. is large, and the refrigerant suction gas velocity at the feeler bulb location is extremely high. At this condition the expansion valve will require a relatively high superheat adjustment in order to control the frost line at the feeler bulb location.

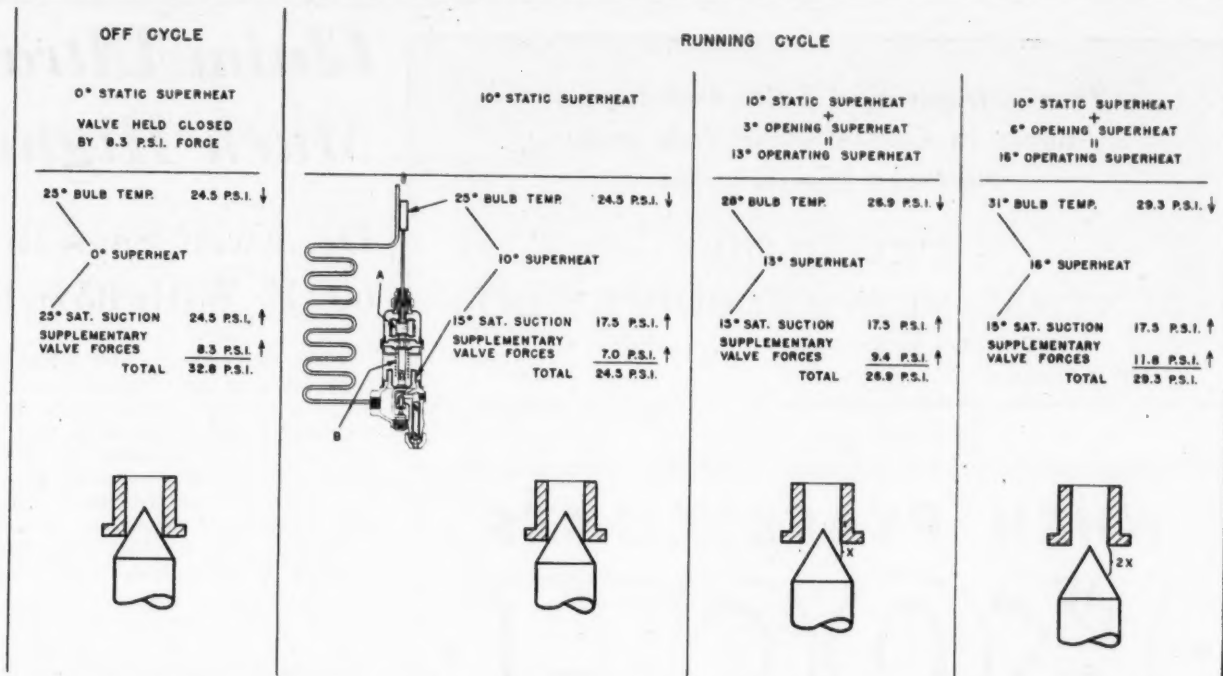
"At the low end of the range the compressor capacity is low, the evaporator T.D. is low, and the refrigerant suction gas velocity is low. At this condition the expansion valve would ordinarily require a relatively low superheat adjustment in order to control the frost line at the feeler bulb location.

"An attempt has been made in the differential temperature valve to compromise the superheat control by having it automatically readjust itself in cases where it is necessary," explained Mr. Carter. "This pull-down superheat control has been made a part of the anti-surge device and performs in the following manner:

## Anti-Surge Device

"Suppose the differential temperature valve to be installed on equipment which must operate at a minimum suction temperature of -100° F. but which must frequently be pulled down from +70° F. For the pull-down adjust the anti-surge device until the surging is minimized. Repeat when necessary until the low operating condition is reached.

"The needle can now open only part way because the anti-surge device serves as a limit to the needle opening. If the load on the unit is increased at this time the suction temperature will increase and there will be a demand for a larger flow of



A study of the above provides a graphic outline of the function of "static" and "opening" superheat in the operation of the thermostatic expansion valve. Mr. Carter has indicated in a simple manner the forces which work to keep the valve open or closed.

refrigerant through the expansion valve.

"The needle opening, however, is limited by the anti-surge device so the evaporator begins to starve, which in turn allows the superheat feeler bulb to warm up excessively. As the temperature difference between the two feeler bulbs increase, the force of the superheat power element becomes much greater and when the difference becomes approximately 10° F. more than the standard differential, the spring in the anti-surge device collapses and the needle opens farther, but the valve

is now operating at a 10° F. higher temperature differential.

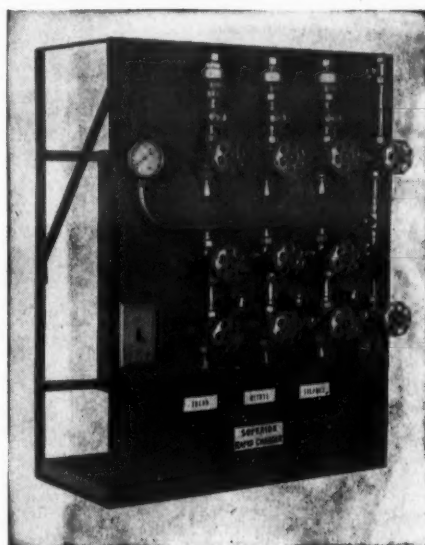
"The exact suction pressure at which the change takes place will depend on the amount of surge at the low temperature condition, and the amount of flood-over at the high operation condition.

"Many low temperature applications are equipped with heat exchangers to take care of the variation in frost line during pull-downs, and it may not be necessary to use this feature on those applications," Mr. Carter declared. "However, on applications where the requirements

cover a very large span of suction temperature it is expected that this feature of the valve will prove useful."

Commenting upon the paper, H. G. Brandt of Carrier Corp. stressed the point that while the type of expansion valve used in a system is important, excellent distribution of refrigerant to the evaporator coils is essential for satisfactory operation, particularly in multi-circuit coils.

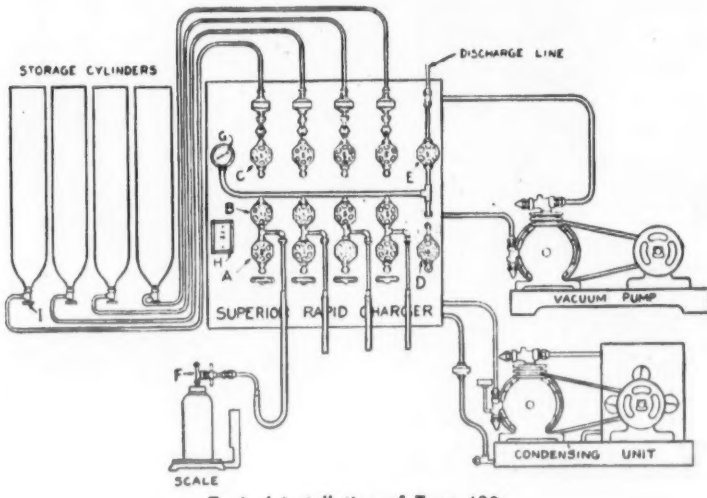
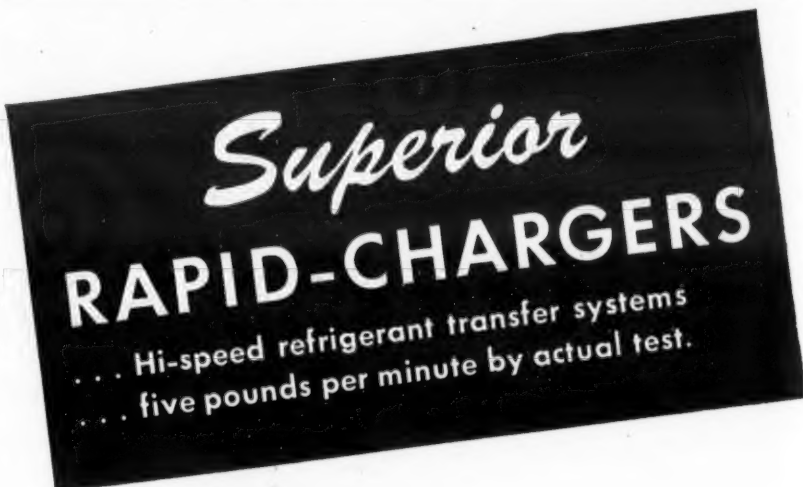
In this Mr. Carter readily agreed. "Selection of the proper distributing device is more important than the valve," he said.



TYPE 630—

TYPE 630—illustrated above, is a complete refrigerant transfer system, with all equipment mounted on a special composition panel.

TYPE 631—illustrated below, is recommended for use where evacuation and discharge, and other facilities provided on Type 630 are not required.

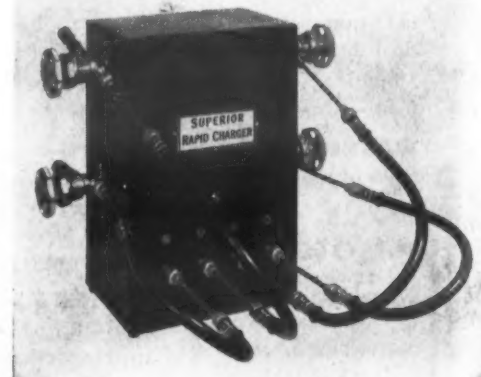


Typical installation of Type 630

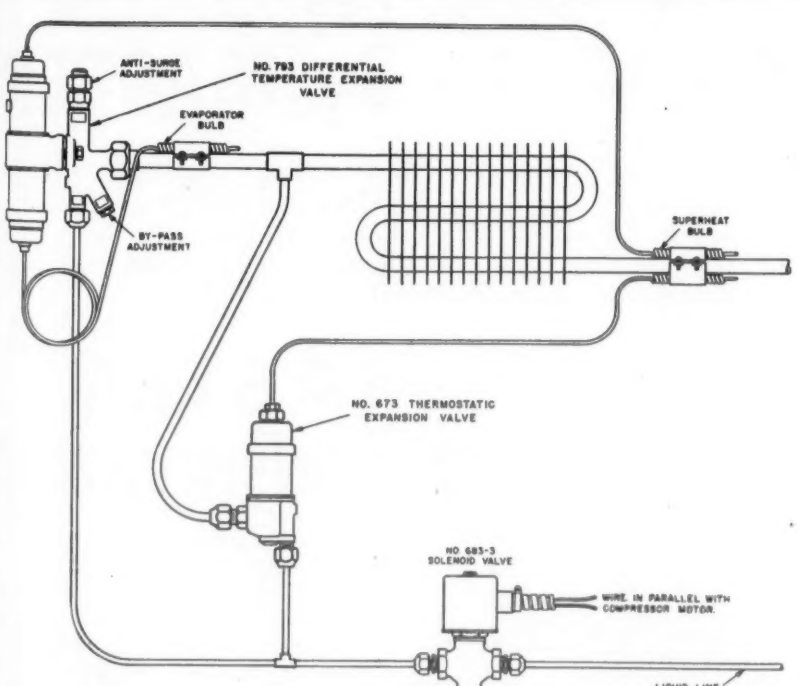
**RAPID-CHARGER** is the result of careful study of all known refrigerant transfer methods, systems and problems pertaining thereto. It has instantaneous liquid coolers—one for each refrigerant to be transferred—connected in series with a refrigerating circuit, using a thermostatic expansion valve, and a small condensing unit with pressure control.

**RAPID-CHARGER** is fast—no valuable time lost in filling cylinders—no purging necessary. Refrigerant losses are practically eliminated.

If you haven't a copy of Catalog R2, request one today.



TYPE 631



This drawing illustrates the method of connecting a standard thermostatic expansion valve in parallel with a differential temperature expansion valve. This type of installation is done when a rapid pull-down is desired. The correct method of installing the differential temperature valve when used by itself can be visualized by eliminating the 673 valve from the above drawing.

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## Claim Ultraviolet Lamp Will Permit Much Higher Storage Temperatures

**Dr. Ewell Says Beef Can Be Aged at  
60° F. With 85% Relative Humidity**

BOSTON — Bactericidal ultraviolet lamps now make it possible to preserve perishable foods safely under humidity conditions so high that the edibles otherwise would be fertile fields for spoilage and mold, according to Dr. Arthur W. Ewell, refrigeration research specialist, and consultant to the Westinghouse Lamp Division at Bloomfield, N. J.

This electronic guardian in storage spaces is the Sterilamp ultraviolet tube, a device which resembles a slenderized fluorescent lamp and kills bacteria and mold either on food surfaces or afloat in air, Dr. Ewell told the New England section of the American Society of Refrigerating Engineers, meeting in Boston.

### Describes Beef Rooms

He described as a striking application of the use of Sterilamps their role in a patented process for the rapid tenderization of beef.

Dr. Ewell explained: by raising the temperature in the beef aging room, protected by lamps, from 36° F. to 60° F., the time required for the natural process of ripening is reduced to about one-tenth of the time previously required. Without

a bactericidal agent such as the lamp's ultraviolet rays, the high temperature combined with the high 85-88% humidity necessary to prevent surface drying and accompanying injury to the meat would result in surface mold and slime, causing serious shrinkage.

A similar result is attained in other food storage and processing rooms where bactericidal ultraviolet lamps are installed, Dr. Ewell said.

### How It Works With Cheese

As an example, he cited the experience of cheese aging in rooms protected by the lamps. To reduce dehydration, a relative humidity of 80% is desirable. To speed the ripening, the temperature is raised to an average of 45-50° F., about 15° higher than in unprotected aging rooms. Thus, the lamps not only permit the acceleration of the cheese ripening process to a fraction of the time, previously required but also reduce shrinkage by dehydration.

In addition to the bactericidal rays, the refrigeration research expert of 40 years' experience explained, the lamps produce in the air a small amount of ozone, a colorless, gaseous form of oxygen used commercially for the purification of water and foods, particularly in egg and apple storage rooms.

### Function of Ozone

Despite the fact that Sterilamp rays are scattered over a wider area than visible light rays, there are hard-to-reach surfaces in food storage and food processing rooms which elude the ultraviolet. So the ozone, which in effect scatters rapidly from the lamp and is circulated throughout the storage space, steps in as an additional weapon to halt mold growth. At the same time, the ozone concentration in food storage and processing rooms properly equipped with the bactericidal

lamps never exceeds a few tenths of one part per million of air, which is too low to injure even sensitive foods.

Radiations emitted by the lamp are much more powerful as a bactericidal agent than the ozone. At 10 feet from the 15-watt Sterilamp, direct radiation will destroy in one hour practically 100% of the common bacteria, such as B. Coli and it will destroy 50% in 12 minutes. To accomplish the same result with ozone, so heavy a concentration would be required that it would be unsafe to enter the room except for a very few minutes.

### Results Difficult Otherwise

In storage spaces unprotected by the ultraviolet radiations emitted by these lamps, it is often impossible to obtain both the benefits from high humidity and freedom from bacterial contamination, according to Dr. Ewell.

The common practice has been to drop the temperature in storage spaces to a point where bacterial growth is drastically reduced. This point varies with the size of the storage compartment, and the temperature cannot be reduced too far without affecting the humidity. For example, a high humidity becomes impractical in domestic refrigerators as temperatures approach the freezing point, Dr. Ewell pointed out.

### Syracuse Distributor Signs With Admiral

SYRACUSE, N. Y.—City Electric Co., Inc., of Syracuse, has been named as exclusive distributor of Admiral refrigerators, and other appliances in this territory. This company was established in 1919 and was Admiral and Stewart-Warner distributor before the war.

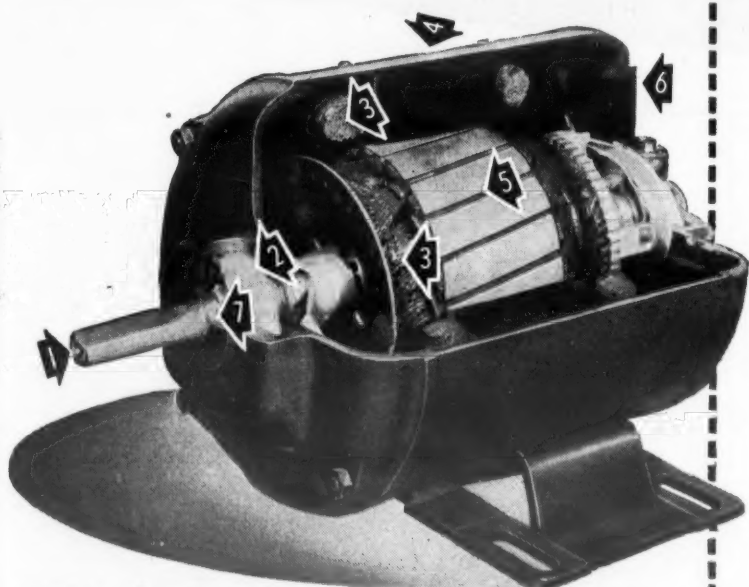
Samuel Weinstein, vice president in charge of sales, is one of the founders. Jacob S. Isaacs is president and treasurer of this company and was also one of the original founders.

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- 2 **LUBRICATION**—Long-strand wool yarn is used in all fractional-horsepower motors. Oil-wells are roomy and the yarn supplies plenty of oil, assuring perfect lubrication at all times.
- 3 **WINDINGS**—The windings of both rotor and stator are of heavily-insulated wire and fit the slots without crowding. Completely insulated and securely wedged into place.
- 4 **FRAME**—Motor frame is formed from heavy sheet steel. Electrically welded to form a strong, rigid, unbreakable frame that will not get out of alignment.
- 5 **SLOTS** in rotor are skewed to reduce magnetic noise, and to eliminate variation in starting-torque at different positions of the rotor.
- 6 **ENDPLATES** are concentrically machined and closely fit accurately machined frames, assuring perfect centering of shaft and uniform airgap.
- 7 **BEARINGS** are steel-backed for strength and babbitt-lined to minimize wear. They are diamond bored after assembly in endplates and have a mirror-like finish.



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Mountings: vertical or horizontal, rigid or resilient.  
Frames: open, drip-proof or explosion-proof.

**WAGNER POLYPHASE MOTORS**—Available in several types of squirrel cage, wound-rotor, self-excited synchronous (Fynn Weichsel), and special air-conditioning and multispeed types.

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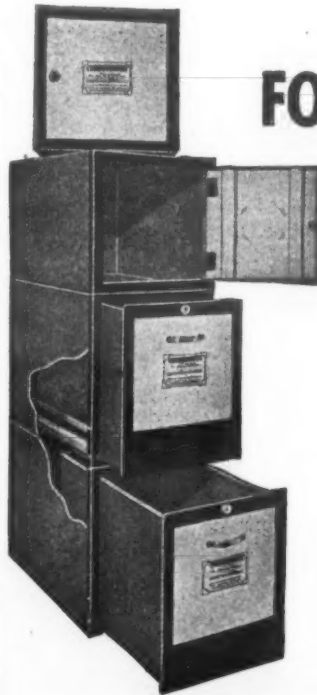
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## New Officers at Kelvinator of Canada



C. W. HADDEN



R. L. C. SMITH

## Kelvinator Promotes Hadden & Smith

(Concluded from Page 1, Column 2)  
Copeland Products, Inc., He was sales manager of that company until 1934, when he left to join Kelvinator in Detroit. He has served as vice president and general manager of Kelvinator of Canada, Ltd., since April, 1935.  
Mr. Smith was comptroller of Rizer Corp. when that company merged with Kelvinator in 1925. He held various positions in the accounting division, and transferred to the Canadian subsidiary as comptroller in 1933. He became assistant secretary in 1938, and secretary of the company in 1939. All matters of contract negotiation and wartime regulations have been under his supervision since that time.

## Young Heads Purchases for Weatherhead

CLEVELAND—Appointment of G. Richard Young to director of purchases for the Weatherhead Co., is announced by H. F. Bailey, company financial vice president.

## Naval Expert Praises 'Reefers' In Pacific

PHILADELPHIA—Tribute to the development of mechanical refrigeration equipment to meet the demands of our amphibious warfare in the Pacific has been paid by C. S. Forester, well-known British author and authority on naval warfare, in his article "Miracle in the Pacific," published in the *Saturday Evening Post*.

In the early establishment of port facilities and shore installations on the islands in the south Pacific, Mr. Forester explained, it took several hours to transfer meat from the refrigerating ship to the shore, and in those hours the meat and other food products went bad—a single hour of tropical sun and rain would do the trick.

"Hence came the demand for refrigerating units, later called 'reefer boxes' each single one, of course, under the 5-ton-weight limit—in which the meat could be sent ashore. From that, it was only a step to the conception of putting these 5-ton units together at the base and dispensing with the construction of big refrigerating buildings on shore.

"The system had the further advantage that when the advance of the Navy made the base less essential, the units could be sent forward to the new base."

In another reference to the "reefer boxes" Mr. Forester said:

"The first ones produced were ingeniously made of stainless steel, so that they could stand in mud and tropical rain without deterioration when shelter could not be provided."

## Home Supply Co. Named Admiral Distributor In Dubuque Area

DUBUQUE, Iowa—Home Supply Co. has been appointed Admiral distributor for the Dubuque, Iowa, territory, announces Ross D. Siragusa, Admiral president.

Personnel of the organization consists of J. C. Gantz, president; O. R. Jaeger, vice president; L. J. Diener, secretary and sales manager, and A. A. Meyer, treasurer and general manager.

A NATIONAL AUTHORITY on cooling procedure stated, "APRIL SHOWERS produces the greatest amount of cooling for the least expenditure."

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SCIENTIFICALLY CONTROLLED ROOF COOLING  
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the quickest, surest way.



Jackson: A refrigerator, madam? Naturally you're interested in one that is really complete—right up to the minute.

Customer: Of course. I want the most modern one you have.



Jackson: Both of these refrigerators have all the usual features and engineering developments. Both are the same size—both are filled with the same amount of food.

Customer: They do look alike except for the doors. What are those shelves on that door?



Jackson: Ah!—that's the big Crosley plus—the patented, exclusive Shelvador®! Notice that I have stored this extra boxful of food in the Shelvador®.

Customer: Perfectly marvelous—why, it's like opening the door to two refrigerators.

\* Reg. U. S. Pat. Off.

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The "right-before-her-eyes" demonstration is the quickest, easiest way in the world to sell a woman the Crosley Refrigerator with the patented, exclusive Shelvador®. Show her—as "Jackson" did—the convenience, the economy, the economy of all that extra front row space!

**ORDINARY BLANK DOOR**      **COMPLETE! THE SHELVADOR®**

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FOOD TO THE FRONT  
WITHIN EASY REACH

JUST REMEMBER to point out that the Crosley has every modern improvement and development in home refrigeration PLUS the Shelvador®—that brings twice as much food to the front within easy reach. No refrigerator is truly complete or modern without it.

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Every Shelvador® owner joins your sales force! One woman tells another—sells another. She convinces her friends just as you convinced her—by showing the tremendous difference a Shelvador® makes. They'll want one—they'll want to know where she bought hers. That means you.

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**AERO-CONDENSER**

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Patented Duo-Pass prevents scaling of condenser tubes.

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WATER COOLERS

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Pacific Coast Supply Jobber  
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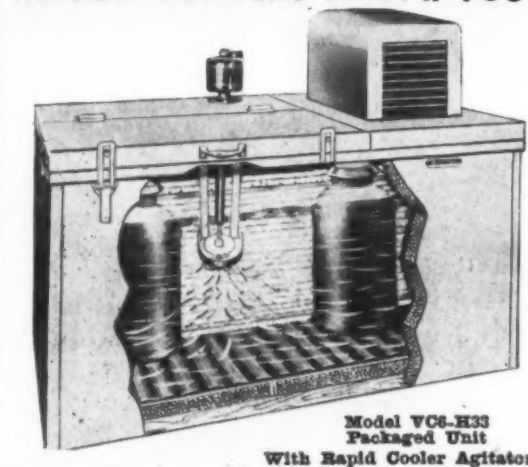
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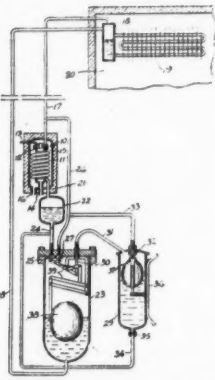
- The Wilson Verti-Coil Cooler equipped with the RAPID-COOLER AGITATOR (Pat.) WILL COOL TWICE THE CABINET CAPACITY DAILY WITH EXTREME RAPIDITY.
- ALL WILSON MILK COOLERS ARE NOTED FOR: RAPID AND UNIFORM COOLING. MAXIMUM COOLING EFFICIENCY. LOW COST OF OPERATION. LIFE-TESTED CONSTRUCTION.

This advertisement is one of a series on Wilson Commercial Refrigeration  
**WILSON CABINET CO.** SMYRNA DELAWARE

## PATENTS

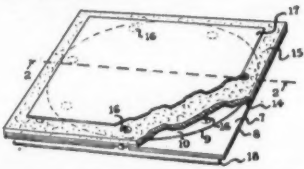
Weeks of Jan. 9 & Jan. 16

2,366,955. **REFRIGERATION.** Henry A. Burgrabe, Evansville, Ind., assignor to Servel, Inc., New York, N. Y., a corporation of Delaware. Application Sept. 30, 1941, Serial No. 411,604. 3 Claims. (Cl. 62-125.)



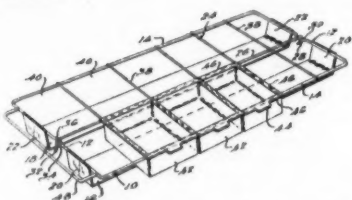
1. A system for effecting cooling at an elevation above a source of refrigeration including an evaporator at the upper elevation, a condenser arranged to be cooled by said source of refrigeration, a conduit for vapor from said evaporator to said condenser, a vessel connected to receive liquid condensate from said condenser and deliver the liquid condensate to said evaporator when the pressure in said vessel is increased sufficiently to force the liquid therefrom upward to said evaporator, a second vessel connected to receive liquid condensate from said condenser, a conduit for vapor from said second vessel into said first vessel, valve mechanism in said first vessel operative responsive to level of liquid therein to control communication between said vessels, and valve mechanism in said second vessel to control admission of liquid therinto.

2,367,097. **CONTROL MECHANISM FOR REFRIGERATING DEVICES.** Leonard F. Clerc, Chicago, Ill. Application Nov. 16, 1942, Serial No. 465,659. 6 Claims. (Cl. 62-91.5.)



1. A control mechanism for a "dry ice" refrigerator, comprising a plurality of layers of rigid material, a layer of heat insulating material, alignable apertures in said layers, means to align said apertures, a "dry ice" platform spaced above and supported by said rigid layers, and a baffle depending from said rigid layers.

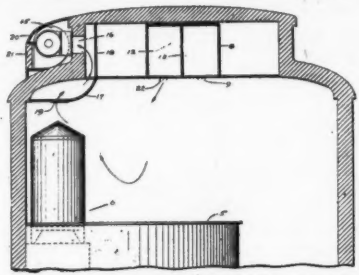
2,367,098. **ICE TRAY.** Arthur E. Cole, Detroit, Mich. Application Oct. 23, 1941, Serial No. 416,150. 13 Claims. (Cl. 62-108.5.)



2. An ice cube forming device comprising generally longitudinally extending bottom supporting members and a generally rectangular shaped frame positioned vertically above the supporting members, a framework to divide the space within the rectangular shaped frame into rec-

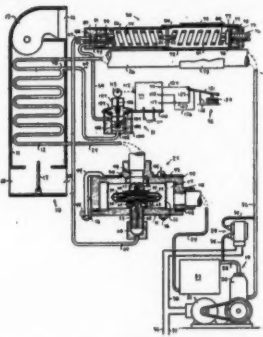
tangular mold receiving spaces, and a plurality of removable individual rectangularly shaped ice block molds in said mold receiving spaces adapted to rest on said members.

2,367,276. **AIR CONDITIONING SYSTEM FOR PASSENGER VEHICLES.** Milton E. Hanson, Haddonfield, N. J., assignor to B. F. Sturtevant Co., Boston, Mass. Application July 16, 1943, Serial No. 494,978. 6 Claims. (Cl. 98-10.)



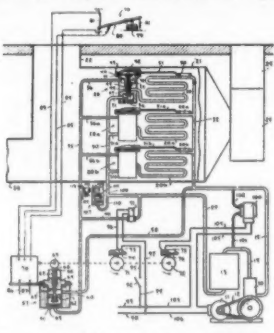
1. In a passenger vehicle having a kitchen at one side thereof and having an air conditioner and an overhead duct through which the conditioned air is supplied into the passenger space, means forming an exhaust air passage over said kitchen at said one side of the vehicle, and means for blowing outdoor air from alongside said duct towards said passage for deflecting heated air from said kitchen away from said duct and towards said passage.

2,367,304. **REFRIGERATION CONTROL SYSTEM.** Alvin B. Newton, Minneapolis, Minn., assignor to Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., a corporation of Delaware. Application Oct. 20, 1939, Serial No. 300,400. 27 Claims. (Cl. 62-6.)



20. In a control system for a refrigerating apparatus having an evaporator for controlling the condition of a medium, the combination of, an expansion valve for regulating the supply of refrigerant to the evaporator, pressure responsive means for operating said valve, means including a passage having a fixed resistance for supplying refrigerant from the upstream side of the valve to the pressure responsive means for closing the valve, means including a passage for bleeding refrigerant from the pressure responsive means to the downstream side of the valve for opening the valve, adjustable control valve means for regulating the flow of refrigerant through the last mentioned passage to position the expansion valve, means responsive to the temperature of the refrigerant near the outlet of the evaporator for adjusting said control valve means, and means responsive to the condition of the medium being controlled by the evaporator acting in conjunction with said temperature responsive means for regulating said control valve.

2,367,305. **REFRIGERATING SYSTEM.** Alvin B. Newton, Minneapolis, Minn., assignor to Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., a corporation of Delaware. Application Nov. 30, 1940, Serial No. 368,002. 15 Claims. (Cl. 62-8.)



1. In a refrigerating system, in combination, a plurality of evaporators, a source of refrigerant supply for said evaporators, means associated with each evaporator for maintaining a given degree of superheat at the outlet thereof, said last means being adjusted to maintain a substantially different degree of superheat at the outlet of each evaporator, and control means cooperative with said first means and operative to simultaneously vary the degree of superheat

(Concluded on Page 31, Column 1)

## CLASSIFIED ADVERTISING

**RATES for "Positions Wanted" \$2.50**  
per insertion. Limit 50 words.  
**RATES for all other classifications \$5.00**  
per insertion. Limit 50 words.  
Advertisements set in usual classified style. Box addresses count as five words, other addresses by actual word count.  
**PAYMENT in advance** is required for advertising in this column.

### POSITIONS AVAILABLE

**WANTED** by old established firm, experienced service mechanic preferably with executive ability to do own work for duration, later take full charge of service and installation commercial refrigeration and air conditioning 3 H.P. and up. Attractive salary. Permanent all year position. **ATMOSPHERIC CONTROL CO.**, 716 Marquette Bldg., Detroit 26.

**WANTED.** Two experienced refrigeration service men. Commercial dealer. Permanent. Monthly salary basis. State age; experience; and salary expected. **MILLER ENGINEERING CO.**, 118 North Winnebago St., Rockford, Ill.

**REFRIGERATION ENGINEER** wanted by one of the leading refrigeration unit manufacturers with exceptional opportunity present and postwar. Must be able to do refrigeration laboratory work on commercial, open and sealed, condensing units and household cabinets. This position affords rapid advancement depending upon ability. Box 1666, Air Conditioning & Refrigeration News.

**ENGINEER**, experienced in design and manufacture of refrigeration compressors and cabinets to expand old established business now chiefly on war work. When applying give full details as to education, experience, salary required. Apply Box 1660, Air Conditioning & Refrigeration News.

**OUTSIDE SALESMEN**, also countermen; experienced, New York City area Supply Jobber. Permanent position. Box 1667, Air Conditioning & Refrigeration News.

**SALES REPRESENTATIVE.** Eastern Seaboard, by aggressive, rapidly expanding Midwestern manufacturing company. Must be energetic and steady, preferably with some knowledge of refrigeration engineering or sales experience. Exceptional opportunity present and postwar for right party. Write Box 1670, Air Conditioning & Refrigeration News.

**WANTED:** A-1 refrigeration mechanic to take charge of commercial refrigeration department for substantial, aggressive, and well established New Mexico firm. Remuneration open and will arrange on satisfactory basis. Excellent climate and living conditions. Write Box 672, Albuquerque, New Mexico for details, giving complete information.

**WANTED** Sales Engineer with experience on automatic flow control devices. Locate New York. Essential industry. Postwar future. Give full details. Box 1673, Air Conditioning & Refrigeration News.

**WE HAVE** an opening for an engineer and designer experienced in heating, ventilating, and air conditioning. Excellent opportunity for a man with qualifications to conduct research projects and supervise engineering department. Please furnish complete references and experience in first letter. **JADEN MFG. CO.**, Hastings, Neb.

**SAN DIEGO, California.** Wright Refrigeration Service requires first class service men at \$1.25 per hour with time and half over 40 hours per week. Steady work, lots of overtime, and the best climate in America. **WRIGHT REFRIGERATION SERVICE**, 1337 India St., San Diego, Calif.

**APPLICATION ENGINEER.** Wanted by internationally known manufacturer. Must have M. E. degree with experience in Air Conditioning and Refrigeration. Opportunity to enter sales in field. Position is essential with permanent future. State qualifications, age, nationality. Box 1672, Air Conditioning & Refrigeration News.

**COMMERCIAL REFRIGERATOR** manufacturer opening Texas branch plant has excellent opportunities for key men. If experienced in design, production, or sales of soda fountains, ice cream cabinets, farm freezers, beverage coolers, or refrigerated display cases, and would like Texas, send information, including age and experience, to Box 1675, Air Conditioning & Refrigeration News.

**REFRIGERATION** shop foreman. \$75 weekly, 48 hours, New York City. Box 1671, Air Conditioning & Refrigeration News.

**REFRIGERATION ENGINEER** with design experience on soda fountains and ice cream cabinets. Splendid opportunity for right man. Box 1674, Air Conditioning & Refrigeration News.

### EQUIPMENT FOR SALE

250 FRIGIDAIRE model "N," "W350," "W233," and "C." All with 110-220 V. 60 cycle, REP. IND. Motors. Remanufactured ice cream cabinets. Send for list and price. **EDISON COOLING CORP.**, 310 E. 149 St., New York 51, N. Y.

**REACH-INS:** Porcelain self-contained and remote, all sizes. Complete stock of condensing units and diffusers. New 6-can milk coolers equipped with 1/2 H.P. General Electric compressors \$260. Walk-in all-steel coolers. Immediate shipments. Phone Rittenhouse 6359 or write **JORDON REFRIGERATOR CO.**, 235 N. Broad St., Philadelphia 7, Pa.

**FOR SALE:** one Tuthill, 2 1/2 gallon freezer, self-contained, complete with 1-H.P. water-cooled compressor. New. \$975. One Sweden soft ice cream freezer, 2 qt. self-contained, complete. Last model. \$300. One Bastian-Blessing carbonator, completely overhauled and guaranteed. \$85. All of above F.O.B. Missoula, Mont., crated and ready to go. **POTTER REFRIGERATION CO.**

### EQUIPMENT FOR SALE

**QUALITY LINE** farm freezers, Reach-all sizes, machines, galvanized lined sectional walk-in coolers, blowers, cut makers, stainless steel beer coolers, 4 and 6 can milk coolers, air pumps, water cooled condensers, etc. Your inquiry welcome. **MAJESTIC REFRIGERATOR CORP.**, 625 Broadway, New York 19, N. Y. Gramercy 7-5000.

### POSITIONS WANTED

**MANUFACTURER'S REPRESENTATIVE.** Qualified Air Conditioning and Refrigeration Engineer, 17 years experience organizing and training Distributor and Dealer personnel. Recently honorably discharged Army Air Forces. Desires to represent reputable manufacturers of Commercial Refrigeration Equipment and kindred parts in Texas and surrounding territory exclusively. Financially responsible. Box 1665, Air Conditioning & Refrigeration News.

**REFRIGERATION** and appliance executive available. Nineteen years experience refrigeration and appliance manufacturers. Thoroughly familiar with all phases service, production, and inspection refrigeration and household appliances. Past experience qualifies me to handle crews or groups of people with maximum efficiency. Member American Society of Refrigerating Engineers. Box 1664, Air Conditioning & Refrigeration News.

**SHOP** or service man. Ten years experience on commercial and domestic refrigeration. Not subject to draft. Prefer position in North or South Carolina. Box 1676, Air Conditioning & Refrigeration News.

**SALES EXECUTIVE** and engineer. 2 years experience sales and manufacturing electrical, mechanical products. Capable organizer and executive. Has successfully sold personally (and in charge of organization) to industries, railroads, utility government agencies, distributors, jobbers, dealers. Knows management, production, sales. University graduate. Compensation based on earnings. Box 1677, Air Conditioning & Refrigeration News.

### BUSINESS OPPORTUNITIES

**FOR SALE:** Refrigeration Sales & Service, excellent location and clientele. One of, if not the best equipped shop in the South. Excellent sales rooms, nice light shop, oil heated. Several nice franchise locations in the fastest growing city in Florida. Box 1668, Air Conditioning & Refrigeration News.

### EQUIPMENT WANTED

**USED** and surplus refrigeration and conditioning equipment is in great demand. Wire us for speedy action at the highest cash price. Parts, units, complete systems purchased anywhere, all sizes and any condition. E. J. FAIRBANKS CO., 2548 E. Tremont Ave. New York City 61, N. Y.

**RECORD COILS** WATER-DEPOSIT  
CANADA PAT. 354,105 U.S. PAT. 2,219,393  
**REFRIGERATION ENGINEERING INC.**  
LOS ANGELES - CALIFORNIA

**Specify DAVIDSON'S DRYERS**  
THAT BEAR THIS LABEL  
CHARGED IN SILICA GEL  
Ask your Jobber

**Use CHICAGO SEALS**  
for seal replacement  
A complete line in all sizes  
**CHICAGO SEAL CO.**  
20 North Wacker Dr., Chicago

**INVENTORS - ENGINEERS**  
Old established manufacturer wants new ideas for finned tubing used in cooling, heating, and air conditioning. Outright purchase or royalty. Box 1669, Air Conditioning & Refrigeration News.

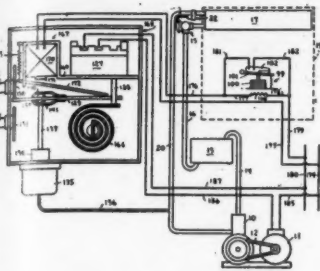
**fedders**  
BUFFALO, N. Y.



## Patents (Cont.)

(Concluded from Page 30, Column 3)  
maintained at the outlet of each evaporator by said first means, whereby when the degrees of superheat maintained at the outlets of the evaporators are simultaneously increased the capacities of the evaporators operating at higher superheat settings are reduced most.

**2,367,306. CONTROL FOR REFRIGERATING APPARATUS.** Alvin B. New, Minneapolis, Minn., assignor to Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., a corporation of Delaware. Application Aug. 1, 1941, Serial No. 65,032. 11 Claims. (Cl. 62-4.)



7. In a refrigerating system having a low pressure side and a high pressure side, in combination, a translating means

**Commercial Refrigeration**  
Modern Display Cases  
Coolers, Refrigerators  
AMANA SOCIETY, AMANA, IOWA

**KRAMER SHELL and FIN-TUBE CONDENSERS**  
COMBINATION WATER COOLED CONDENSERS AND LIQUID RECEIVER  
KRAMER TRENTON COMPANY  
TRENTON, N. J.

**GENUINE MAYFLOWER**  
CONDENSING UNITS AND PARTS  
Jobber Inquiries Invited  
A complete line backed by nearly a quarter century of user confidence. Write for prices.  
MAYFLOWER PRODUCTS, INC.  
13 S. 3th St., Richmond, Ind.

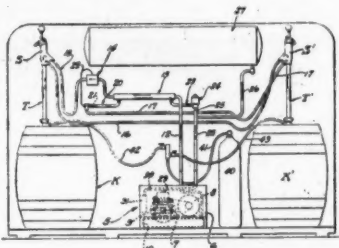
**Canadian Refrigeration Journal**  
The only publication servicing the industry in Canada  
National Business Publications Limited  
Gardenvale, Que. - Canada

**DOLE**  
VACUUM PLATE  
COOLING and FREEZING UNITS  
CHICAGO

**MARLO**  
COIL COMPANY  
SAINT LOUIS, MISSOURI

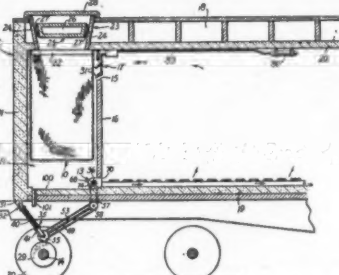
for circulating refrigerant from said low pressure side to said high pressure side; and means for controlling the operation of said translating means including a unitary control mechanism, said control mechanism including means responsive to low side pressure, means operated by said pressure responsive means for normally deenergizing said translating means when said pressure is below a certain value, means emitting heat when said translating means is energized, and means responsive to the temperature of said mechanism as a whole for causing energization of said translating means when the temperature of said mechanism is below a predetermined value even though said pressure is below said certain value, said mechanism being so constructed that the heat from said emitting means raises the temperature of said mechanism as a whole above said predetermined value and thus renders ineffective said temperature responsive means, and so that the heat capacity of said mechanism as a whole is sufficient to maintain said temperature above said predetermined value for a period of time after deenergization of said translating means.

**2,367,340. COOLING SYSTEM.** Carl L. Daun, Milwaukee, Wis., assignor to Chill-Quick Corp., a corporation of Wisconsin. Application Feb. 17, 1940, Serial No. 319,438. 2 Claims. (Cl. 225-1.)



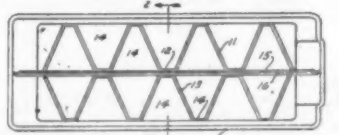
2. A system for cooling and dispensing beverages comprising a plurality of containers for the beverage, each having a standard tap bushing, a tap rod inserted through and held by said bushings, said rods having a portion extending to a low point within said container, a discharge conduit for said beverage extending through said tap rod, a refrigerant passage within said tap rods extending from an inlet opening in said rod above said bushing into said portion and returning up to an outlet opening in said rod above said bushing, a cooling unit having its compression side connected to an expansion valve and its suction side connected to a pressure regulating valve, a refrigerant conduit extending from said expansion valve and permanently connected to an inlet opening of one of said rods, a refrigerant conduit extending from said pressure regulator and permanently connected to an outlet opening of another of said tap rods, and refrigerant carrying connections extending from the outlet opening of said first tap rod to the inlet opening of said other tap rod.

**2,367,502. REFRIGERATION APPARATUS.** George E. Hulse, New Haven, Conn., assignor to The Safety Car Heating & Lighting Co., Inc., a corporation of Delaware. Application July 22, 1942, Serial No. 451,951. 4 Claims. (Cl. 62-24.)



1. In railway car structure, the combination with a chassis assembly and a wall structure forming a lading space and an ice bunker, with a top opening and a bottom opening placing the lading space and ice bunker in communication, whereby air tends to circulate from said lading space through said top opening to said ice bunker and thence through said bottom opening to said lading space again; of a damper assembly positioned in said top opening to restrict the air circulation therethrough; temperature responsive means positioned in said lading space and operatively connected to said damper assembly to control the same whereby the air circulation is reduced as the temperature in the lading space falls; a fan positioned in said bottom opening having its inlet within said bunker and operative regardless of the direction it is driven to exhaust air from the bottom of said ice bunker into the bottom of said lading space, said fan being of a construction to permit substantially unrestricted flow of air through said bottom opening when said fan is not operating; and means mechanically connecting said fan to the car axle to drive the fan without introducing air into the car, whereby movement of the car results in the operation of said fan in promoting the moving of air from the bottom of the ice bunker and into the bottom of the lading space and this air movement is restricted by said damper assembly in accordance with the control effect influenced by said temperature responsive means.

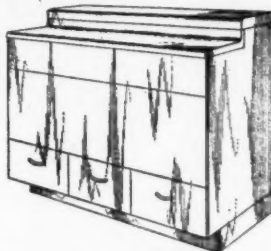
**2,367,573. ICE TRAY.** Donald M. Gibson, Greenville, Mich., assignor, by mesne assignments, to Gibson Refrigerator Co., Greenville, Mich., a corporation of Michigan. Application Oct. 6, 1941, Serial No. 413,797. 7 Claims. (Cl. 62-108.5.)



4. An ice tray comprising a receptacle and means in said receptacle for dividing the latter into a plurality of separate ice compartments, said means comprising two juxtaposed independently removable one-

piece partitions arranged in non-overlapping abutting relationship, one of said partitions being of serpentine configuration and engaging the other partition only at widely spaced intervals, said partitions having portions adjacent their upper edges spaced apart but closely paralleling each other in a direction longitudinally of the receptacle whereby to permit the insertion therebetween and provide relatively wide bearing areas for a lever for prying the partitions apart.

**140,047. DESIGN FOR A REFRIGERATOR CABINET.** John H. Benson, Salem, Ohio, assignor to Mullins Mfg. Corp., Salem, Ohio, a corporation of New York. Application March 16, 1944, Serial No. 112,933. Term of patent 7 years. (Cl. D67-3.)



The ornamental design for a refrigerator cabinet, as shown and described.

## M-H Forms New Zone With Headquarters In Houston

HOUSTON, Tex.—Formation of a new sales zone, with headquarters in Houston, has been announced by the Minneapolis-Honeywell Regulator Co.

The zone will encompass the territory in the Southwest formerly under jurisdiction of the Atlanta zone and will maintain offices in Houston, Dallas, Tulsa, and New Orleans.

Robert Mallory, formerly branch manager of the Houston office, has been named as manager for the new southwestern zone.

## 2 New Types of Cooling Towers Added by Binks

CHICAGO—Two new series of mechanical draft cooling towers of small and medium capacity designed for either indoor or outdoor operation have been introduced by the cooling equipment division of Binks Mfg. Co. here.

Exceptionally quiet operation is claimed for one of the new series, described in bulletin No. 700, through use of a slow speed, double inlet blower. This type cooler tower is produced in five frame sizes suitable for water cooling requirements of refrigeration condensers up to 20 tons capacity.

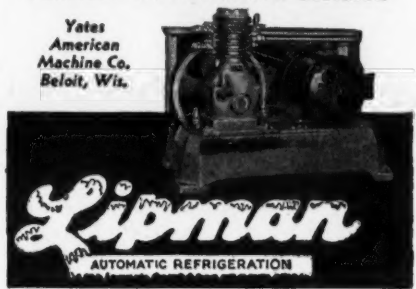
Silent operation of this unit, plus its compactness and neat appearance, should fit in with postwar demands for packaged air conditioning and refrigeration installations, the company believes.

A complete line of horizontal, induced draft cooling towers is featured in bulletin No. 600. Air inlet supply in these models is obtained through the rear, using aluminum alloy propeller type fans.

These towers, in single fan assemblies, are available in 11 frame sizes for capacities up to 150 g.p.m., and in five twin-frame sizes for capacities up to 300 g.p.m. The manufacturer recommends these for general water cooling applications, including air conditioning and refrigeration work.

In the larger sizes the design permits locating heat exchange coils in the spray zone for the indirect cooling of soft water for diesel engine jackets up to limited horsepower ratings.

**WAR INDUSTRIES NEED REFRIGERATION**  
The use of refrigeration in industry has been greatly accelerated by the war. In peacetime this expansion may logically be expected to continue. Write for literature.  
GENERAL REFRIGERATION DIVISION



**Filtrine**  
HIGH EFFICIENCY  
**LOW TEMPERATURE WATER COOLERS**  
For Bakeries, Bottlers and General Application  
Capacities to 300 G.P.H. and storage to 150 gallons.  
Water Cooled to 34 degrees.  
SAFE-DEPENDABLE-EFFICIENT SHIPMENT FROM STOCK  
Write for Complete Catalog  
**FILTRINE MANUFACTURING CO.**  
53 Lexington Ave., Brooklyn 5, N. Y.  
"Manufactured for Over 40 Years"



## The Dish that went to War Again...

Strangely enough this is a story of a dish-shaped spring which was first used by a French Military Officer named Belleville, as a recoil spring for a cannon.

Years later, Inland engineers solved the principle of applying this dish-shaped spring to an Inland Clutch which became standard equipment on many famed makes of passenger cars and trucks.

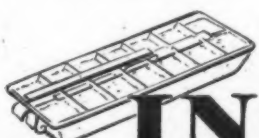
Today, in wartime, this same simplified spring with only three moving parts, is a vital part of Inland-

made Clutches which are helping LS boats, tanks and military vehicles deliver men and materiel to global combat fronts.

So, because of the resourcefulness of Inland's peacetime engineering and manufacturing ability, this dish of steel has gone to war again—this time to help fighting Americans move on to Victory.

INLAND MANUFACTURING DIVISION  
General Motors Corporation  
DAYTON, OHIO

KEEP ON BUYING WAR BONDS



**INLAND**  
Manufacturing  
RUBBER, METAL, PLASTICS

★★★★★  
Inland Products for Victory include Carbines, Tank Tracks, Gun Sights, Helmet Liners, Extinguisher Horns, and Rubber, Synthetic Rubber and Metal Parts for Tanks, Aircraft, Submarine Chasers, Torpedo Boats, Artillery Lighters and Landing Craft.  
★★★★★



## WPB Gives Status Of Range Production

(Concluded from Page 1, Column 2)

electric ranges and 1,000 three-burner ranges in the first quarter. In the second quarter the company may make 3,250 four-burner ranges and 500 three-burner ranges.

Production authorizations assigned under the 1944 programs for electric ranges, fans, and irons have been canceled, and any of these items that are completed in the first quarter of 1945 will be considered part of the total amount authorized for the first quarter under the 1945 programs.

Within the limits of approved WPB programs, WPB will authorize production where it will not require materials, components, facilities, or labor needed for war purposes or otherwise interfere with war production. The approved quarterly programs for 1945 are: 35,000 domestic electric ranges, 25,000 domestic and commercial electric fans, and 526,500 electric irons.

About 35% of the total 1945 production of electric ranges will go to the armed forces and the National Housing Agency, the remainder to

institutions and individual consumers who certify need and can show that no additional wiring will be required on their premises.

All the fans to be produced in 1945 will be used for essential military, hospital, institutional, and industrial purposes. None will be available for home or office use.

Nearly all the electric irons may be sold for civilian purposes, and only a small percentage will go to the armed forces.

Under Controlled Materials Plan Regulation No. 1, as amended Jan. 25, 1945, manufacturers who are unable to produce to the extent of their quarterly authorizations may make up production deficiencies only in the quarter immediately following the one for which the authorizations were issued, and then only up to 10% of the total quarterly production authorized.

## Production For War To Keep Its Pace After V-E Day

WASHINGTON, D. C.—There is no room for tooling up or other reconversion planning, no time for talk of easing up on war production schedules, until Germany actually gives up, according to the details of military policy announced in Washington last week.

There will be no speedy or general reconversion even after the fall of Germany. After VE day enough labor, materials, and facilities will be released "to start getting ready for reconversion," but not enough for immediate production of any peacetime civilian goods.

Within four to six months after Germany's capitulation, WPB has estimated, military orders may let up enough to allow production to begin on the most essential civilian goods. But this is estimate, nothing more, spokesmen point out. It will depend entirely on the way of the war itself.

Only the end of the war in Asia, then, will bring large scale reconversion and full production of peacetime products. Civilian shortages, especially in those products using metal, will continue with little or no improvement until that time.

Reason for this major reversal in the policy worked out six months ago by top military men and Donald M. Nelson, then chief of WPB, under which a 40% cutback in war contracts was to follow VE day, is the change in pace and in volume of production now planned for the in-

vasion of the Japanese Empire.

The old plan would have freed enough men and materials for substantial reconversion immediately. The new plan is not only one of gradual and careful reconversion, but implies closer government control along the way.

The need for continued intense production is the result of these decisions: 1. The armies now being planned are considerably larger than those planned for six months ago. 2. They are going to have all new equipment, the newest and most powerful weapons made. 3. The merchant fleet that will transport and supply them is being greatly increased. 4. The Pacific war fleet itself probably will be strengthened.

Add to these requirements the tremendous demands in big guns and shells and motor transport—all of them calling for more steel.

### MANHATTAN F/HP V-BELTS

**MORE POWER**  
Grips the grooves... stops slip—flexible construction for uniform "pull"

**LONGER WEAR**

Endless cord construction resists internal heat and side wear.

**SILENT RUNNING**

Smooth running and noiseless on high-speed drives.

THE MANHATTAN RUBBER MFG. DIVISION  
of Raybestos-Manhattan, Inc.  
Towansend Street Passaic, New Jersey

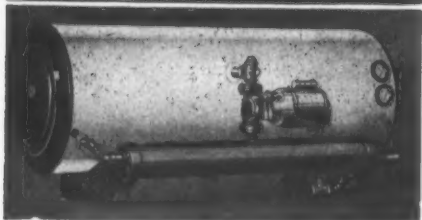
The Newest and Finest  
**ELECTRIC WaterCoolers**

ALL SIZES FOR NAVY and LAND USE

EXCLUSIVE DEALER FRANCHISE

Manufactured by  
**THE REVELATION CO.**  
L. E. RABJOHN  
2801 San Fernando Rd. Los Angeles 41, Calif.

## HIGH SUCTION PROCESS WATER COOLERS



25 to 150 gallon storage capacities.

135 to 1000 G. P. H. recovery capacities.

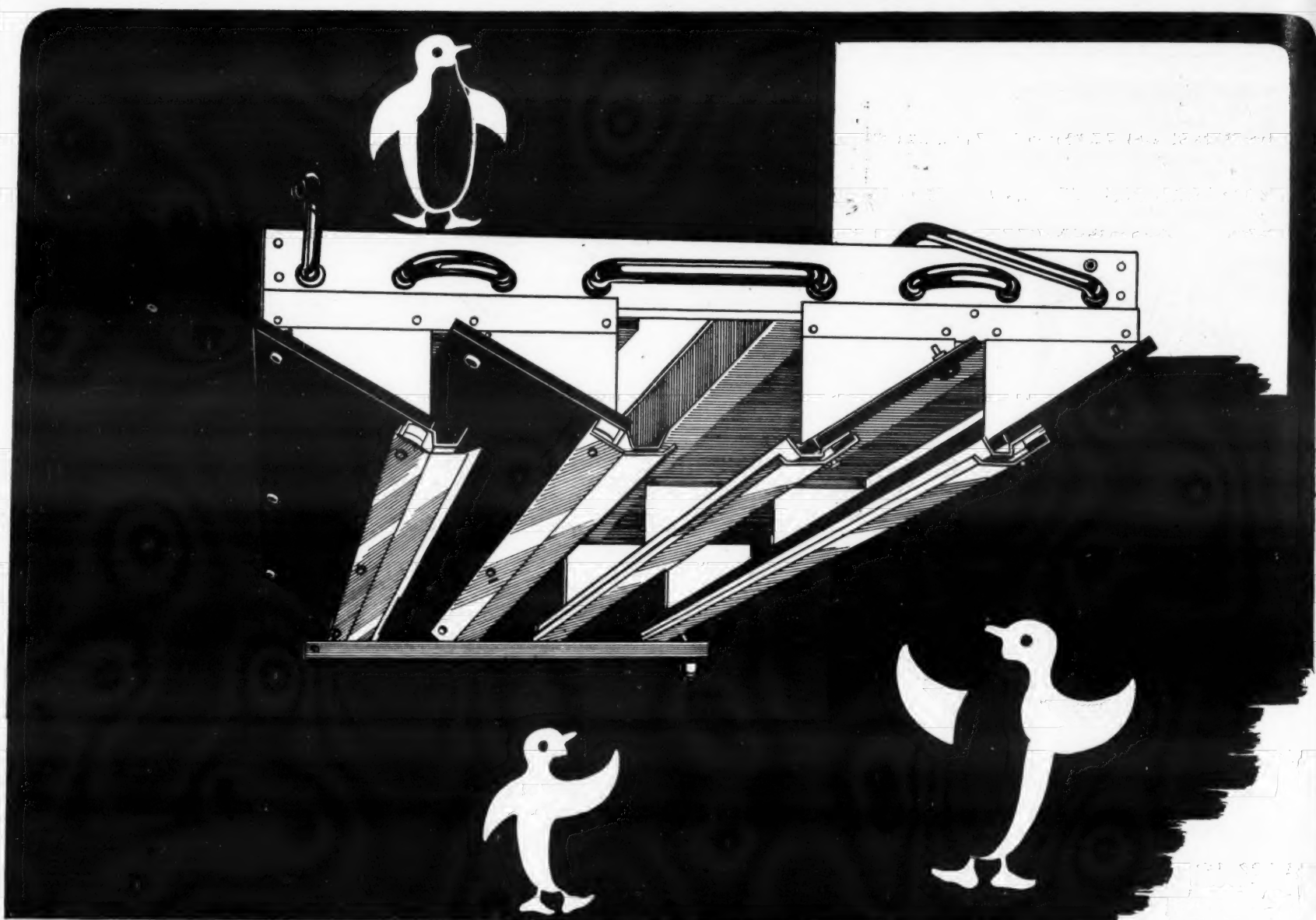
Suitable for bakery ingredient, jacket cooling, film processing air conditioning or other commercial cooling.

Available with or without agitator pumps.

DAY NIGHT  
**COOLER DIVISION**  
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